

ENVIRONMENTAL ASSESSMENT FOR PHYSICAL FITNESS CENTER

TINKER AIR FORCE BASE, OKLAHOMA



Prepared for:

**AIR FORCE CENTER FOR ENGINEERING
AND THE ENVIRONMENT/EXE
BROOKS CITY-BASE, TEXAS**

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FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT PHYSICAL FITNESS CENTER AT THE TINKER AIR FORCE BASE

AGENCY: Department of the Air Force, Air Force Materiel Command, Tinker Air Force Base (AFB), Oklahoma County, Oklahoma.

BACKGROUND: The 72nd Air Base Wing has prepared an environmental assessment (EA) to address the construction of a new Physical Fitness Center (PFC) and a Health and Wellness Center (HAWC) to follow current United States Air Force design guide requirements. This EA has been accomplished pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations implementing NEPA, Department of Defense (DoD) Directive 6050.1, *Environmental Effects in the United States of DoD Actions*, Air Force Instruction (AFI) 32-7061, the Environmental Impact Analysis Process, and 32 Code of Federal Regulations (CFR) Part 989, Environmental Impact Analysis Process.

ALTERNATIVE 1 - NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed PFC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004. The HAWC functions would continue to be served by Building 5922. Building 216 would continue to have infrastructure code and criteria deficiencies to include accessibility, structural, plumbing, electrical, and mechanical. Buildings 5922 and 6004 are functionally inadequate for employees and Air Force personnel. Code violations would continue to persist and the facilities would be operating outside of the expected life expectancy for the structures.

ALTERNATIVE 2 - PROPOSED ACTION

The Air Force will construct a new PFC in the northwest portion of Tinker Air Force Base (AFB, the Base) near the corner of 34th Street and McNarney Avenue in Fiscal Year 2015 and a new HAWC will be located within the new facility. The existing facilities located in Buildings 216 and 6004 will be demolished along with the swimming pool located adjacent to Building 6004. Additionally, the existing HAWC located in Building 5922 and six other buildings (5915, 5916, 5920, 5924, 5927, and 5937) will be demolished. Design of the new facility will be in conformance with the Air Force Services Facilities Design Guide for Fitness Centers.

SUMMARY OF FINDINGS FOR ALTERNATIVE 1:

The conditions and characteristics anticipated under the No-Action Alternative for each resource area will continue at levels equal to those occurring under the existing condition. No significant environmental impacts are experienced or generated by the existing condition. Therefore, no significant impacts will be expected for the No-Action Alternative. However, the current physical fitness facilities at Tinker AFB are functionally obsolete and dilapidated with numerous structural deficiencies in the foundation and outer walls. The facilities are undersized and can only accommodate about 55 percent of the active duty military forces assigned to the Base.

SUMMARY OF FINDINGS FOR ALTERNATIVE 2:

Air Quality. The greatest annual emissions for any of the criteria air pollutants will be 1.72 tons per year for sulfur oxides, which equates to less than 0.05 percent of the baseline emissions within the air quality control region (AQCR). The emissions from construction activities are temporary and non-recurring in nature and are therefore not considered a major source of emissions. A conformity determination is not required. The AQCR is in attainment for all criteria pollutants. No significant air impacts will occur.

Infrastructure and Utilities. A net decrease in the demand for energy will occur upon completion and operation of the new PFC and HAWC. More building space will be demolished than constructed. A net decrease of 32,677 square feet (ft²) will result, thereby decreasing energy consumption. Solid waste from demolition and construction debris disposed equates to 0.15 percent of the total remaining capacity of the landfill.

Proposed construction activities on Tinker AFB will not alter existing transportation systems on Base. Traffic patterns on the Base will not change from existing conditions. No major traffic delays will be anticipated; however, some minor traffic delays are anticipated during project construction. Those traffic delays will cease once construction is complete. Therefore, implementation of the Alternative 2 will not be expected to impact transportation infrastructure.

Since Building 216 will be demolished and not replaced, there will actually be a decrease in traffic on Sentry Road between Avenues D and F. Traffic near the new PFC and HAWC facilities will increase slightly since military and civilian personnel who previously used the facilities in Building 216 will now drive to the new facility located at 34th Street and McNarney Avenue. The commute to the new PFC facility for military personnel living in the dormitories and military family housing areas will be half as much as it was when traveling to Building 216.

Biological Resources. Construction and demolition activities will occur within developed and previously disturbed areas. No known federally threatened or endangered species are thought to inhabit the project areas. Alternative 2 will not substantially change habitat for plant or animal species, nor will it diminish an important plant or animal species. There will be no impacts to vegetation within the developed areas of the Base.

Water Resources: *Surface Water* - The Base's storm water pollution prevention plan (SWPPP) and storm water and erosion control best management practices (BMP) will be incorporated into the construction activities to prevent soil erosion and possible siltation of the ephemeral water bodies. Therefore, no significant surface water impacts are anticipated. *Wetlands* - No demolition or construction activities associated with the Proposed Action will occur within a wetland. However, a small wetland is located approximately 1,100 feet north of the proposed PFC and HAWC facilities. Adherence to the Base's SWPPP and BMP for erosion control and sediment control measures will minimize potential impacts to the wetland. No significant adverse impacts will be anticipated to wetlands. *Floodplains* - Under the Proposed Action, construction and demolition activities will not occur in a floodplain. Therefore, no impacts to floodplains will be expected.

Earth Resources. The site for Alternative 2 is relatively flat and previously developed; therefore, changes in topography are not expected. Geology will not change and soil

disturbances will be minimal and of short-duration. However, it is anticipated the contractor will minimize disturbance of the topography and soil to retain as much of the natural setting as possible. The contractor will ensure a SWPPP is completed and approved before initiating activities. The plan will include BMPs for erosion control techniques. For these reasons, no soil impacts are expected.

Hazardous Materials and Hazardous Waste. Hazardous materials and waste will be managed in accordance with existing Tinker AFB, State, and federal plans and regulations. Demolition and construction activities will not interfere with the Installation Restoration Program site that occurs below the ground surface near Building 216. It is unlikely that construction or demolition activities will encounter contaminated soil or groundwater. The demolition contractor will be responsible for all asbestos containing material and lead-based paint removal, which will be removed in accordance with existing guidance. No significant impacts are anticipated because the Proposed Action will not result in noncompliance with applicable federal and Oklahoma environmental quality regulations, cause waste generation that cannot be accommodated by current Tinker AFB waste management capacities, or interfere with the environmental restoration program.

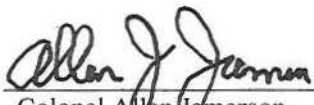
Noise. Demolition and construction equipment noise will be intermittent, short-term in duration, and restricted to the daytime. The primary source of noise throughout and after the project is completed will continue to be aircraft operations. No significant noise impacts will occur.

Land Use. No change to land use designations on the Base will be required. The planned location of the PFC and HAWC will be compatible with existing and future land uses and in accordance with land use plans for the Base and surrounding areas. Therefore, there will be no land use impacts.

Environmental Justice. Activities associated with Alternatives 1 and 2 will not impose adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects will occur to children or minority and low-income populations.

DECISION

Based on my review of the facts and analyses contained in the attached environmental assessment, incorporated herein by reference, I conclude that implementation of the Proposed Action will have no significant impact, either by itself or when considering cumulative impacts. Accordingly, requirements of the National Environmental Policy Act, regulations promulgated by the Council on Environmental Quality, and 32 CFR 989 are fulfilled and an environmental impact statement is not required.



Colonel Allen Jamerson
Chairperson, Environmental, Safety, and
Occupational Health Council

19 May 09

Date

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APRIL 2010



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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ACM	asbestos-containing material
AFB	Air Force Base
ANSI	American National Standards Institute
AQCR	air quality control region
BMP	best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CY	calendar year
DoD	Department of Defense
DoDD	Department of Defense Directive
EA	environmental assessment
ECFR	Electronic Code of Federal Regulation
EIS	environmental impact statement
EMCO	Environmental Compliance Operations Branch
EO	Executive order
ERP	environmental restoration program
ESPC	Energy Savings Performance Contract
FICON	Federal Interagency Committee on Urban Noise
FY	fiscal year
FONSI	finding of no significant impact
GWTP	groundwater treatment plant
HAWC	Health and Wellness Center
HM	hazardous material
HPP	Health Promotion Programs
HVAC	heating, ventilation, and air conditioning
HW	hazardous waste
HWSF	hazardous waste storage facility
INRMP	Integrated Natural Resources Management Program
IRP	Installation Restoration Program
ISWMP	Integrated Solid Waste Management Plan
LBP	lead-based paint
MSW	municipal solid waste
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NLR	noise level reduction
NPL	National Priorities List
OC-ALC	Oklahoma City Air Logistics Center
ODEQ	Oklahoma Department of Environmental Quality
OG&E	Oklahoma Gas and Electric
ONG	Oklahoma Natural Gas
OU	operable unit
PFC	Physical Fitness Center
PFC	Physical Fitness Center
RCRA	Resource Conservation and Recovery Act
ROI	region of influence

SIP	state implementation plan
SWPPP	storm water pollution prevention plan
the Base	Tinker AFB
UFC	unified facilities criteria
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA NRCS	U.S. Department of Agriculture Natural Resource Conservation Service
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
WMA	wildlife management area

WEIGHTS AND MEASURES

dB	decibel
DNL	day-night sound level
ft ²	square feet
µg/L	microgram per liter
µg/m ³	micrograms per cubic meter
kWH	kiloWatt hour
lbs	pounds
MMBTU/Hr	million British Thermal Units per hour
msl	mean sea level
ppm	parts per million
tpy	tons per year

CHEMICAL UNITS

CO	carbon monoxide
CO ₂	carbon dioxide
N ₂ O	nitrous oxide
NO	nitric oxide
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
O ₃	ozone
Pb	lead
PCB	polychlorinated biphenyl
PM ₁₀	particulate matter with aerodynamic diameters less than or equal to 10 micrometers
PM _{2.5}	particulate matter with aerodynamic diameters less than or equal to 2.5 micrometers
SO ₂	sulfur dioxide
SO _x	sulfur oxides
TCE	trichloroethylene
TSP	total suspended particulates
VOC	volatile organic compound

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

This chapter discusses Introduction; Background; Purpose of and Need for Action; Location of the Action; Decision to be Made; Scope of the Environmental Review; Baseline Conditions; Resources not Considered in the EA; Environmental Justice; Applicable Regulatory Requirements; and Organization of the Environmental Assessment (EA).

1.1 INTRODUCTION

The primary mission of Tinker Air Force Base (AFB) (the Base) is to provide for the management, storage, and depot maintenance of all components and the end commodity items of all major weapons systems assigned to the Oklahoma City – Air Logistics Center (OC-ALC). The Base's largest organization is the OC-ALC, one of three depot repair centers in the Air Force Materiel Command, located at Wright-Patterson AFB, Ohio. Depot level maintenance of the B-1B Lancer, the E-3 Sentry, B-52 Spirit, C/KC-135, the E-6B Mercury, and 25 other Contractor Logistics Support aircraft fall under the responsibility of the OC-ALC. OC-ALC also provides system management and logistics support for the B-2 and Air Force One. Additionally, OC-ALC conducts oversight of 23,000 aircraft engines, and a multitude of missile systems for the Department of Defense (DoD) (Tinker AFB 2005).

Tinker AFB proposes to construct a new Physical Fitness Center (PFC) and a Health and Wellness Center (HAWC) to follow current Air Force design guide requirements. The HAWC is the physical location for the Health Promotion Programs (HPP). The Air Force HPP focuses on the “core” areas of nutrition, physical fitness, stress management, cancer and cardiovascular disease prevention, body composition improvement, and tobacco cessation, as well as other behavioral, social, and cultural issues that create health promotion opportunities, such as child safety and balanced lifestyles.

The potential environmental consequences associated with the construction and operation of the PFC, as well as alternatives, are evaluated in the EA.

1.2 BACKGROUND

Nearly all physical fitness workouts on Base are done on an outdoor running track, a converted Quonset hut (Building 216) that was originally constructed 1943, or in the Gerrity Fitness Center, which is a 36 year old undersized gymnasium (Building 6004). The HAWC is operated out of Building 5922 and is located on the opposite side of the Base from Building 216. The Recreation Services organization, located at the Gerrity Fitness Center, maintains the athletic fields and courts, and organizes adult outdoor sports leagues, such as flag football and softball. The PFC and HAWC were originally scheduled for construction in fiscal year (FY) 2011 in anticipation of the 2009 Stimulus Bill passed by President Obama's administration. However, the project did not get added to the stimulus package and as a result, the project was delayed and is now scheduled for construction in FY 2015.

The new PFC and HAWC facilities would be constructed in an area near the existing Housing Office (Building 5927), HAWC (Building 5922), Housing Storage Facility (Building 5924), Pavilion (Building 5937), and Dormitories (Buildings 5915, 5916, and 5920).

Since 2000, the Base has evaluated numerous alternatives and locations for a new PFC. These alternatives are further discussed in subchapter 2.2

1.3 PURPOSE OF AND NEED FOR ACTION

The current physical fitness facilities at Tinker AFB are functionally obsolete and dilapidated. Building 216 has numerous structural deficiencies in the foundation and outer walls. The facilities in Building 216 and 6004 are undersized and can only accommodate about 55 percent of the active duty military forces assigned to the Base. Off-Base physical fitness facilities are limited, distant, and are very expensive. Snow, wind, and temperatures ranging from 32 degrees Fahrenheit (°F) to over 100° F, along with seasonal changes, frequently limit all outdoor activity. This limits the time that Base personnel can conduct mandatory training.

The purpose of the Proposed Action is to provide for a new PFC and HAWC facility that would meet existing and future physical fitness needs and improve morale, welfare, and recreational opportunities for all Tinker AFB eligible personnel. Fitness centers are intended to support the requirement for individual physical fitness, better enabling military personnel to perform the Air Force mission and to provide and promote services, programs, and activities. The existing PFC facilities at the Base are unable to support these requirements due to limited gymnasium space and substandard facilities. The facilities are inadequate in providing effective and minimum conditioning and exercising requirements. Consequently, there is a great need to provide a facility to meet minimum Air Force requirements for physical fitness at the Base. Moreover, the fitness center facilities in Building 216 are housed in a structure that is not structurally adequate. Other facility deficiencies may include the presence of asbestos containing materials and lead based paint. The programs and services provided by the existing facilities are directly related but are located in completely separate buildings. The new PFC will provide for a more efficient use of space.

Tinker AFB is motivated to maintain maximum energy efficiency for Base facilities as dictated by Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, 2007. Therefore, a need has been identified for more energy efficient facilities that comply with building performance for constructing and renovating buildings in accordance with sustainability strategies, including resource conservation, reduction, use, and indoor environmental quality. EO 13423 sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, renewable energy, sustainable buildings, electronics stewardship, fleets, and water conservation. In addition, the order requires more widespread use of Environmental Management Systems as the framework in which to manage and continually improve these sustainable practices.

1.4 LOCATION OF THE PROPOSED ACTION

Tinker AFB is located in Oklahoma County in the southeastern city limits of Oklahoma City, Oklahoma. The Base covers more than 5,000 acres and is adjacent to Midwest City to the north and Del City to the west. Oklahoma City is served by Interstate Highways 35, 40, and 44. The proposed Physical Fitness Center is located on the west side of the Base north of the Twining Fields military family housing area near the northwest corner of 34th Street and McNarney Avenue. Figures 1-1, 1-2, and 1-3 at the end of this chapter show the location of the

Base and surrounding area, and the location of the proposed PFC, HAWC, and buildings to be demolished.

1.5 DECISION TO BE MADE

The decision to be made by the Chairman of the Environmental, Safety, and Occupational Health Council at Tinker AFB is whether to:

- Take no action (No Action Alternative); or
- Construct a new physical fitness center (Proposed Action).

1.6 SCOPE OF THE ENVIRONMENTAL REVIEW

The *National Environmental Policy Act* (NEPA) of 1969, as amended, requires federal agencies to consider environmental consequences in the decision-making process. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA. The Air Force Environmental Impact Analysis Process is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508) and 32 CFR 989 (*Air Force Environmental Impact Analysis Process*), 15 Jul 99, and amended March 28, 2001 and July 9, 2007. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The CEQ regulations indicate that an EA may be prepared to:

- Assess any action at any time to assist agency planning and decision making.
- Briefly provide evidence and analysis to determine whether the Proposed Action might have significant impacts that would require preparation of an environmental impact statement (EIS). If the analysis determines that the environmental impacts will not be significant, a finding of no significant impact (FONSI) will be prepared; or
- Aid the agency in complying with NEPA when no EIS is necessary.

The EA will assess the potential environmental impacts related to the construction and use of physical fitness center at Tinker AFB. The EA identifies, describes, and evaluates the potential environmental impacts that may result from implementation of the action as well as possible cumulative impacts from other actions planned for the Base. The EA also identifies required environmental permits relevant to the Proposed Action. As appropriate, the affected environment and environmental consequences of the Proposed Action may be described in terms of site-specific descriptions or regional overview. Finally, the EA identifies mitigation measures to prevent or minimize environmental impacts, if required.

Due to the nature of this project, only the following biophysical resource areas were identified for assessing potential impacts at Tinker AFB: noise, land use, air quality, infrastructure and utilities (including energy, storm water management, solid waste management, and transportation), biological resources (including vegetation and wildlife, threatened and endangered species, wetlands, and floodplains), earth resources (including geology, topography, and soil), hazardous materials and hazardous waste management (including asbestos-containing material [ACM], lead-based paint [LBP], pesticides, and

environmental restoration program [ERP] sites), socioeconomic resources, and environmental justice.

1.7 BASELINE CONDITIONS

The baseline conditions used for the environmental evaluation in this EA are assumed to be calendar year (CY) 2008. However, if CY08 data are not available, the most recent information will be used. The analysis will be considered on an average annual basis.

A region of influence (ROI) will be established for each resource area affected by the Proposed Action and Alternatives. The ROI determines the geographical area to be addressed as the affected environment. Although the Base boundary may constitute the ROI limit for some resources, potential impacts associated with some resources extend beyond the Base boundary.

1.8 RESOURCES NOT CONSIDERED IN THIS ENVIRONMENTAL ASSESSMENT

Safety and health impacts arising from construction, maintenance, and operation of the physical fitness center will not be evaluated, as contractors would be responsible for compliance with applicable Occupational Safety and Health Act regulations specifying appropriate protective measures for all employees. Polychlorinated biphenyls (PCB) will not be evaluated, as Tinker AFB is a PCB-free facility (Mowad 2003). Radon will not be evaluated, as radon emissions testing indicated radon concentrations at the Base are well below the U.S. Environmental Protection Agency (USEPA) action level of 4.0 picoCuries per liter (Tinker AFB 1999; Tinker AFB 2003).

It is anticipated that there would be no change in water consumption or wastewater generation from the current levels due to the Proposed Action because no additional Air Force or civilian personnel would be assigned to Tinker AFB to operate the proposed PFC and HAWC facilities (Tinker AFB 2009). Additionally, water consumption likely would decrease because the new facilities would have water saving devices installed. For these reasons, no water or wastewater system impacts would be anticipated. Water could be used for dust suppression during the short-term construction activities. However, the amount used would be minimal when compared to the Base's average daily use, and the application would cease when the project is completed. For these reasons, water supply and wastewater generation, which are typically included in utilities and infrastructure, are not assessed further in this EA.

Groundwater withdrawal would not be expected to exceed baseline conditions. No groundwater impacts would be anticipated from the construction and operation of the PFC and HAWC facilities. Therefore, groundwater, which is normally included with surface water under water resources, is not assessed further in this EA.

The areas where the Proposed Action would take place at Tinker AFB have had extensive surface disturbance that most likely would have exposed and disturbed any sites that may have been of historical significance or there is a low potential for archaeological remains based on previous archeological surveys. The construction activities associated with the Proposed Action would occur in an area of the Base that has been disturbed by previous activities such as construction of roads, buildings, and fences. However, if any suspected archaeological sites are encountered during a project, the contractor must protect the site in place and report the discovery to the government. According to Tinker AFB personnel, no adverse effects to

archaeological or historical resources would be anticipated from the Proposed Action activities at Tinker AFB (Tinker AFB 2009). Therefore, cultural resources will not be analyzed further in this EA. No long-term changes would be anticipated to area population, housing requirements, school enrollment, or economic factors (*i.e.*, sales volume, income, or employment) because no changes in Air Force personnel assignments would be attributable to the Proposed Action. It is assumed the local labor pool would be sufficient to supply the necessary labor for the project construction. Thus, there would be no short-term impacts to area population, housing requirements, or school enrollment. For these reasons, no socioeconomic impacts would be anticipated, and socioeconomic resources are not analyzed further in this EA.

1.9 ENVIRONMENTAL JUSTICE

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the president on February 11, 1994. In the EO, the president instructed each federal agency to make “achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Adverse is defined by the Federal Interagency Working Group on environmental justice as “having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms.”

In addition to EO 12898, the president signed EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which mandates the investigation of environmental effects on children. This EO acknowledges that children may suffer disproportionately from environmental health risks and safety risks. Therefore, each federal agency is required to make it a priority to identify and assess environmental health and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.

Based on analysis of impacts conducted for this EA, it is determined that activities associated with the No Action Alternative and Proposed Action would not impose adverse environmental effects on adjacent populations, including minority and low-income populations. No disproportionately high and adverse effects would occur to minority and low-income populations.

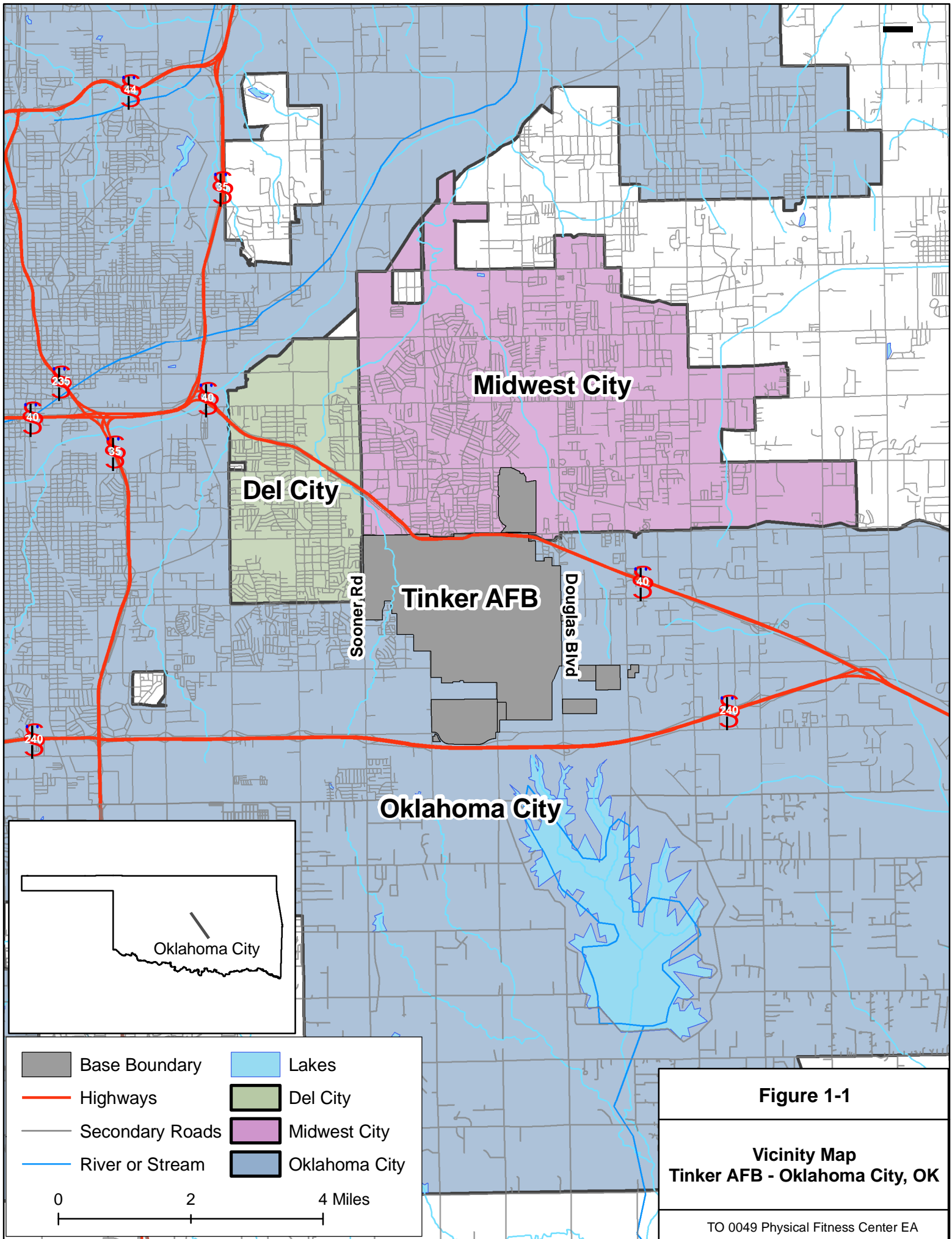
1.10 APPLICABLE REGULATORY PERMITS

The existing basewide emissions air permit would have to be modified to include the boiler operations at the TAC. Other permits and amendments to existing permits may be required by the Proposed Action. It would be the construction contractor’s responsibility to ensure permits are identified and obtained from Base, local, state, and federal agencies. Tinker AFB would coordinate permit requirements identified by the construction contractor during the project. The contractor would ensure that a storm water pollution prevention plan (SWPPP) and other applicable construction permits are completed and approved before initiating any construction activities.

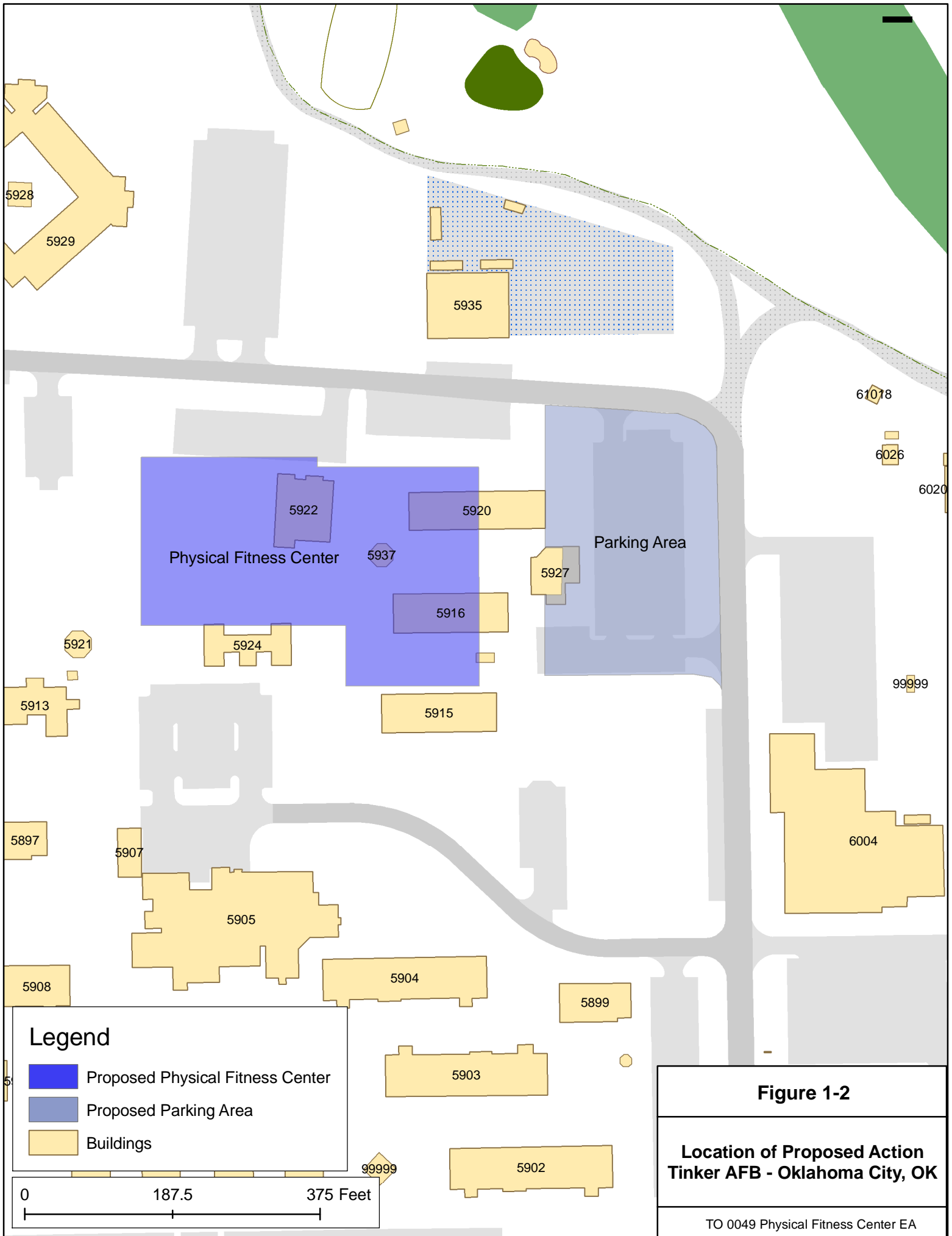
1.11 ORGANIZATION OF THE DOCUMENT

This EA is organized into seven sections.

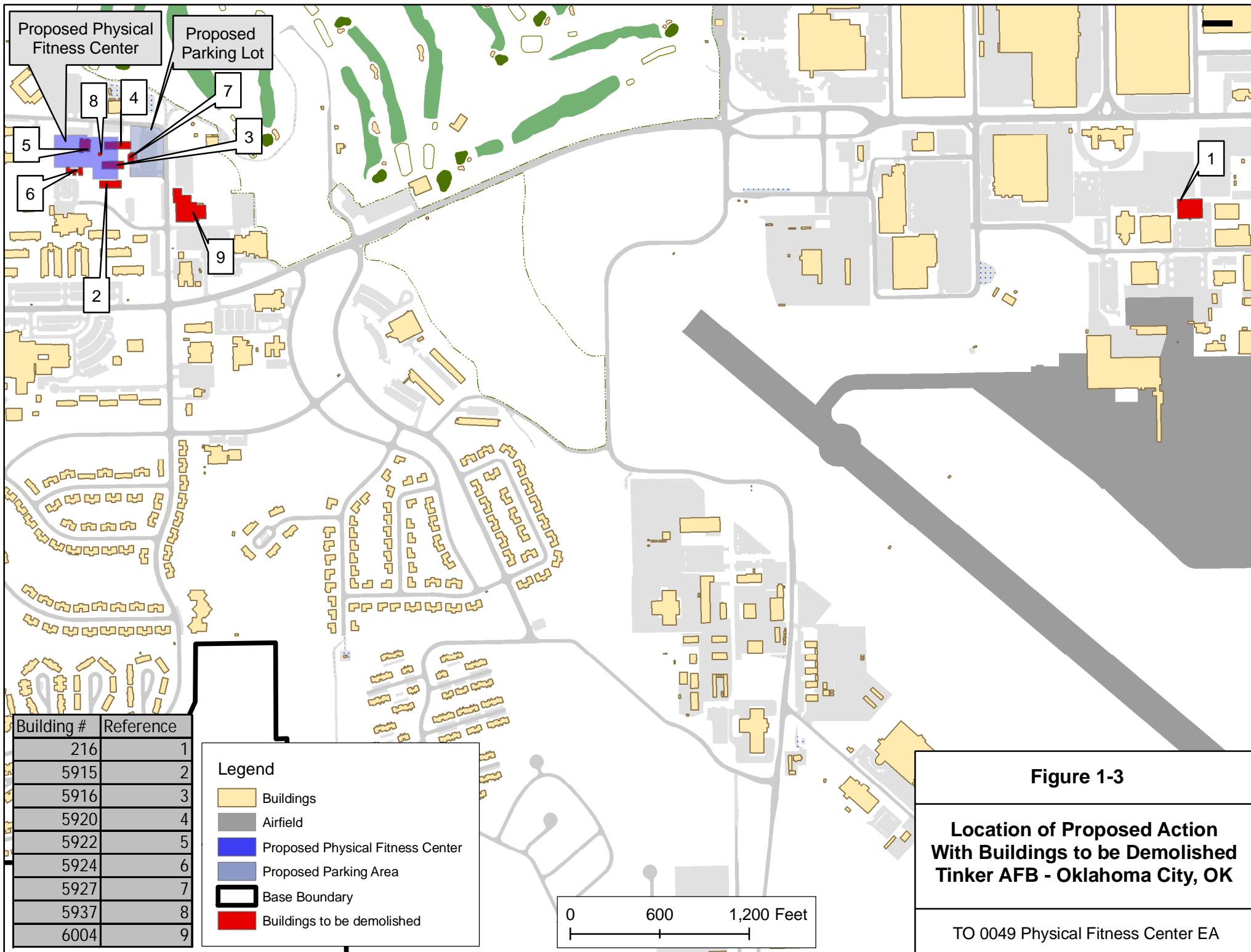
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|------------------|---|
| <i>Chapter 1</i> | Contains introduction, background, a statement of the purpose and need for the action, location of the action, a statement of the decision that must be made, scope of the environmental review, baseline conditions, resources not considered in the EA, environmental justice, presentation of the applicable regulatory requirements, and organization of the EA. |
| <i>Chapter 2</i> | Contains the formulation of the alternatives, describes the selection criteria for development of the alternatives, describes the alternative considered but eliminated from further consideration, details the Proposed Action (Preferred Alternative), presents other actions announced for the Base, and summarizes the environmental impacts for the Preferred Alternative. |
| <i>Chapter 3</i> | Contains a general description of the biophysical resources and baseline conditions that potentially could be affected by the Preferred Alternative. |
| <i>Chapter 4</i> | Discusses the environmental consequences, mitigation requirements, and cumulative impacts of the Preferred Alternative. |
| <i>Chapter 5</i> | Lists preparers of this document. |
| <i>Chapter 6</i> | Lists the persons and agencies consulted in preparation of this EA. |
| <i>Chapter 7</i> | Lists the sources of the information used in preparation of this EA. |



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CHAPTER 2

DESCRIPTION OF THE ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter discusses Formulation of Alternatives; Selection Criteria for Alternatives; Alternative Eliminated from Further Consideration; Description of Proposed Alternatives; Selection of the Preferred Alternative, and Other Actions within the ROI.

2.1 FORMULATION OF ALTERNATIVES

Tinker AFB manages an ongoing planning process that evaluates how well existing facilities, infrastructure, and land use meet mission requirements. This evaluation process also considers long-term land use to meet expected future requirements. When a facility no longer meets the mission, or it becomes apparent there will be a future insufficiency, multiple options are explored to resolve the deficiency.

Once a facility is identified as not satisfying the functional needs of its mission, the Base planning process is used to determine how best to resolve the deficiency. This process includes development of a proposed action and other alternative actions that consider issues such as the need for the facility, where the facility should be located to best accomplish the mission, what is the need date to ensure there is no degradation of the mission, and what is the most cost effective and efficient manner to complete and operate the facility.

2.2 SELECTION CRITERIA FOR ALTERNATIVES

The preferred alternative is selected by determining and evaluating the most appropriate Base facility for construction of a new PFC and HAWC. Criteria for selection of the preferred alternative include:

- The alternative must be consistent with the Tinker AFB Area Development Plan;
- The alternative must comply with the Unified Facilities Criteria (UFC) 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, for force protection and standoff distances (UFC 2007);
- The alternative must comply with EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, 2007;
- The alternative site must provide easy access for a large group of airmen and military family members located in nearby dormitories and housing areas;
- The alternative must take advantage of existing Base infrastructure (utilities and roads);
- The alternative provides the opportunity to redevelop a previously developed site instead of constructing in a new area; and
- The alternative must limit excess infrastructure, environmental, and operational constraints for Tinker AFB

2.3 ALTERNATIVE ELIMINATED FROM FURTHER CONSIDERATION

Tinker AFB Civil Engineering and Force Support Services personnel considered other alternative site locations for construction of the new PFC and HAWC facilities. The site

selection process began in early 2000 and consisted of several alternative sites. Many of these sites are outside the Community Center portion of the Base, which comprises a large grouping of dormitories, military family housing, and other Base support facilities such as the Commissary, Post Office, Base Exchange, hobby center, and banking facilities. Additionally, some of the alternative locations did not meet UFC 4-010-01 (UFC 2007) for force protection standoff distances or they already have satellite fitness centers within reasonable distances to facilities in the South Forty and Building 3001 areas. Therefore, most of these alternative site locations were dismissed because they did not meet the selection criteria established for the preferred alternative.

The Base developed a Dormitory Plan based on current occupancy rules established for airmen living off-Base. The plan also includes a list of dormitories that were deficient based on current Air Force housing criteria and living standards, and therefore were deemed uninhabitable. These dormitories were constructed between 1976 and 1984 and do not meet current design criteria established for housing areas, and have numerous structural deficiencies and contain ACM and LBP. As a result of the new occupancy rules and noted deficiencies, the dormitories have been selected to be demolished and the space utilized for constructing the new PFC and HAWC. The Proposed Action site meets all the selection criteria discussed in subchapter 2.1. Thus, Tinker AFB will consider only Alternative 1 (the No Action) and Alternative 2 (the Proposed Action).

2.4 DESCRIPTION OF PROPOSED ALTERNATIVES

2.4.1 Alternative 1 - No Action Alternative

Under the No Action Alternative, the proposed PFC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004. The HAWC functions would continue to be served by Building 5922. Building 216 would continue to have infrastructure code and criteria deficiencies to include accessibility, structural, plumbing, electrical, and mechanical. Buildings 5922 and 6004 are functionally inadequate for employees and Air Force personnel. Code violations would continue to persist and the facilities would be operating outside of the expected life expectancy for the structures.

The No Action Alternative, or maintaining the *status quo*, is not desirable. Nonetheless, CEQ regulations specify that the No Action Alternative be carried forward for analysis to identify potential impacts that might occur if the Proposed Action were not implemented. In addition, the No Action Alternative serves as a baseline for comparison to the Proposed Action.

2.4.2 Alternative 2 – Proposed Action

Under the Proposed Action, a new PFC would be constructed near the northwest corner of 34th Street and McNarney Avenue in FY 2015 and a new HAWC would be located within the new facility (see Figure 1-2). The existing facilities located in Buildings 216 and 6004 would be demolished along with the swimming pool located adjacent to Building 6004 (see Figure 1-3). Additionally, the existing HAWC located in Building 5922 and six other buildings (5915, 5916, 5920, 5924, 5927, and 5937) would be demolished. A 49,200 square foot (ft²) parking lot associated with these facilities would also be demolished. Design of the new facility would be in conformance with the Air Force Services Facilities Design Guide for Fitness Centers (USAF 2005).

The existing water, electricity, natural gas, and wastewater systems would be used for the proposed new PFC and HAWC facilities. Additionally, the concrete parking area adjacent to 34th Street and McNarney Avenue has deteriorated over the years and would be demolished and replaced with a larger one constructed at the same location. Existing roads along 34th Street and McNarney Avenue would be used to access the area. Table 2.1 details the number of buildings and other structures that would be demolished as part of the Proposed Action as well as the year constructed and amount of disturbed area. Descriptions of the buildings to be demolished are described following Table 2.1 (Walko 2009).

Table 2.1 Summary of Proposed Action Demolition Activity

Facility	Year Constructed	Building Area (ft ²)	Footprint (ft ²)	Disturbed Area (Acres)
Building 216 – One Story	1943	21,797	21,797	0.50
Building 5915 – Three Stories	1976	17,410	5,803	0.13
Building 5916 – Three Stories	1984	21,463	7,154	0.16
Building 5920 – Three Stories	1985	20,534	6,845	0.16
Building 5922 – Two Stories	1993	6,207	3,103	0.07
Building 5924 – One Story	1993	5,500	5,500	0.13
Building 5927 – One Story	1985	3,219	3,219	0.07
Building 5937 – One Story	1985	1,000	1,000	0.02
Building 6004 – One Story	1968	38,719	38,719	0.89
Total		135,309	93,140	2.14

ft² – square feet

Building 216 (Existing PFC)

Building 216, the gym annex, is a one-story structure constructed in 1943 and contains a total of 21,797 ft². A facility use study conducted in February 1991 for the Tinker AFB Base Comprehensive Plan determined the overall physical condition and functionally was in good condition; however, since then the facility has developed structural deficiencies in the foundation and outer walls that were identified in subchapter 1.3. Additionally, the facilities in Building 216 are undersized and cannot accommodate the required number of active military personnel assigned to the Base.

Exterior. The facility is of a wooden frame construction with an exterior wall cladding system based on installing insulation as part of the outside wall (Dryvit Systems).

Interior. Interior areas include weight rooms, sauna (male and female sides), racquetball courts, handball courts, locker rooms, and restroom and shower facilities.

Building 5915 (Dormitory)

The three-story structure was constructed in 1976 and contains a total of 17,410 ft². The facility is used for unaccompanied military housing personnel. The building is located adjacent to where the proposed new PFC is to be constructed. A facility use study conducted in May 1991 for the Tinker AFB Base Comprehensive Plan determined the overall physical condition and functionally was in fair condition.

Exterior. The primary structural components were in good condition except for cracked stucco and elevated concrete walkways. Secondary structural components are in good condition except for moisture-damaged wall and ceiling finishes. The heating, ventilating, and air condition (HVAC) does not provide adequate ventilation, but the electrical system seems to be in good condition. Functionally, egress requirements appear to be met. The facility is efficiently planned, and circulation is uninhibited. Support areas are present, but storage space is inadequate. Handicap accessibility requirements are not met, and the facility has limited horizontal expansion capability.

The concrete foundation is not visible, but there are no apparent signs of differential settlement. The superstructure appears to be an exposed steel framing system of tube columns with steel wide flange sections supporting open web steel floor joists and a steel deck. The exterior closure appears to be steel stud walls with a combination of brick and stucco. The stucco has several control joints, but cracks are occurring within the field and next to some of the control joints. The brick appears in fair condition, with minor efflorescence and dirt. Stucco soffits below exterior walkways are cracked and water-stained. There are several cracks in the elevated exterior walkways, radiating perpendicular to the building, which may be a source of the water infiltration that is staining the stucco soffit below.

The roof is a built-up ballasted system with reported leaks. The roof surface is blistered and appears to have had several repairs. Base flashings are exposed, but there are no visible splits or tears. Roof drains appear operational, and base flashings on equipment appear undamaged. Cable television lines are routed on the outside of the building; they are an eyesore, and some of the conduit covers are missing.

The exterior staircases have a cracked and peeling paint coating. The abrasive nosing is exposed, and the concrete is popping up. One hose bibb on the first floor is leaking and staining the stucco, and it keeps the sidewalk wet and moldy.

The exterior doors are hollow metal doors that operate easily. The paint system is in good condition, but the weather stripping on several doors is damaged. New threshold weather seals are being installed because water enters under the doors, and the door of one utility room is not square in the frame, causing the door to bind on the strike side jamb.

The exterior windows are aluminum-framed, insulated units. Windows appear undamaged, but some of the metal frames are rusting.

Interior. Dormitory rooms appear small but seem to function. Finishes include worn carpeting and stained textured vinyl wall covering. The ceiling tape and bed joints are visible

but not deteriorating yet. Indirect lighting fixtures are provided. Built-in closets for storage are provided in the lavatory area but seem small.

The restrooms that are provided are shared by two adjacent rooms. The rooms are equipped with a water closet and tub/shower unit. There are two single-occupancy rooms in the building that have private restrooms. Painted surfaces are cracked and peeling due to the high humidity level caused by a lack of ventilation in the restrooms. Floor and wall finishes are undamaged.

One laundry facility is provided on the second floor and appears to function as intended. It has vinyl composition tile flooring with a floor drain, although the floor does not slope to the drain, and the washing machines have overflowed and damaged the gypsum board ceilings and walls in the manager's office below.

Dayrooms are small and will not accommodate a very large group. Carpeting appears new and undamaged; vinyl wall covering is peeling from the walls and is stained in places; the painted gypsum board ceiling has been repaired in one of the rooms; and the tape and bed joints are visible. A janitor's closet with a mop sink and storage for cleaning supplies is provided on each floor; it is accessed from the outside only. Storage for the facility is inadequate according to user requirements.

The HVAC system is reported to have had problems but is currently functional. The ground set condenser or chiller is noisy and can be heard in all the rooms on the north side of the building.

Building 5916 (Dormitory)

The three-story structure was constructed in 1984 and contains a total of 21,463 ft². The facility is used for unaccompanied military housing personnel. The building is located within the area where the proposed new PFC is to be constructed. A facility use study conducted in May 1991 for the Tinker AFB Base Comprehensive Plan determined that the overall physical condition and functionally was in fair condition.

Exterior. Physically and functionally, the building is in fair condition but is in need of general maintenance and repair. The primary structural components are in different stages of repair. The exterior closure and roof system are in need of repair, and doors and windows need to be replaced. Secondary structural components are in fair condition. The HVAC and electrical service systems appear in good operating condition. Functionally, egress requirements appear to be met. Work areas appear to function as intended but seem small, and circulation is uninhibited. Support areas are provided and used as intended. Handicap accessibility requirements are not met, and there is no expansion capability.

The concrete foundation of Building 5916 is not observable, but no differential settlement is apparent to indicate problems. The superstructure is a steel post and beam frame with open web steel floor and roof joists, interior masonry partitions, and an exterior closure of face brick and stucco. Exterior walkways are a composite steel deck and concrete slab. The concrete is cracking, and where some cracks have occurred, expansion joint material has been installed. The steel structure is corroding in areas. The stucco finish is cracking and does have moisture damage. Stucco soffit panels are cracked and moisture damaged, and joint material is punctured and missing in areas. Construction joints have some signs of corrosion. There is

evidence that the facility does leak around perimeter joint locations, causing water damage to the interior rooms.

The roof is a built-up gravel surfaced system with reported leaks. One area has been stripped of tar and gravel with no evidence of replacement to be accomplished and there is evidence of moisture damage in the ceiling at this corresponding location. Metal fascia has no signs of deterioration.

Exterior wood doors are warped and do not fit plumb in their openings due to expansion and contraction in extreme weather. The doors are hard to unlock. Hardware is corroding, and weather stripping is loose and warped. Infiltration is excessive, making rooms extremely cold. The paint system on the doors is latex paint applied over an oil-based paint. This incompatibility between finish systems is causing excessive cracking and peeling of the paint system.

Two exterior stairways are provided - one at the west end and the other at an intermediate location. Steel toe guards are corroded and worn, and handrails are corroding.

Windows are insulated metal sliding units. The window frames have no signs of deterioration, but the mechanical parts are breaking, causing the windows to be hard to operate. The track wheels are in a plastic housing that breaks easily and pops out of its location. The windows do not appear to be square in their openings, resulting in the windows' being unable to be locked and causing an unsecured situation. Window seals are broken.

Interior. The facility is constructed to provide exterior walkways along the length of the facility. The dorm rooms are then provided with private entries, giving the appearance of apartment style living. The rooms appear small and are generally occupied by two individuals. Built-in closets are provided in addition to free standing storage units. Carpeting is worn and stained, and textured ceiling finish has moisture damage.

Bathrooms are provided along the central axis of the facility and are shared by two rooms back to back. This area provides a common tub/shower and water closet. The individual rooms are provided with separate vanities and lavatories. Fixtures have no signs of deterioration. The cabinetry does have some signs of moisture damage in some of the rooms. Medicine cabinets are corroding. The areas are not vented, which causes a mildew problem throughout all rooms. The vinyl tile does have some corrosion stains.

Each floor of the facility has an electrical panel room. Each of these areas is used for storage for the operation of the facility. Individual occupant storage is provided in an adjacent facility, and lawn equipment storage is provided in an adjacent storage shed.

Building 5920 (Dormitory)

The three-story structure was constructed in 1985 and contains a total of 20,534 ft². The facility is used for unaccompanied military housing personnel. The building is located within the area where the proposed new PFC is to be constructed. A facility use study conducted in May 1991 for the Tinker AFB Base Comprehensive Plan determined the overall physical condition and functionally was in fair condition.

Exterior. Physically and functionally, the facility is in good condition. The primary structural components are in good condition. The secondary structural components are also in good condition except for the absence of any light fixtures in the individual dorm rooms. The

HVAC is in good operating condition, and the electrical supply is limited. Functionally, egress requirements appear to be met, but handicap accessibility is not present. The facility has no expansion capability.

The structural components of Building 5920 include an unexposed concrete foundation supporting a steel post superstructure. The enclosure is a combination of brick veneer on the east and west sides and precast concrete panels on the north and south sides of the facility.

The roof is an asphalt, built-up gravel roof surface with no reported leaks. All related base wall flashings and metal fascias are in good condition and appear watertight.

The exterior doors are painted metal with metal frames that are in good condition with all hardware in place for proper usage.

Windows are aluminum frame, thermal type units in good condition with all screens properly attached.

The concrete balconies have no signs of deterioration. Handrails are properly attached and secured.

Interior. The exterior water faucets on the ground floor freeze in the winter months, cracking the plumbing inside the walls and creating water damage to the interior of several of the dorm rooms.

The individual dorm rooms have painted wall finishes and vinyl wall coverings. All interior finishes are bright and clean, but the carpets are soiled and stained in most areas.

The restrooms for each individual dorm have easily maintained finishes, and all fixtures and accessories are in good condition.

Building 5922 (Existing HAWC)

Building 5922 is the existing HAWC facility and was constructed in 1993 within the area of where the proposed new PFC is to be located. The two-story building contains a total of 6,207 ft². The facility is used by the occupational health section attached to the Base medical units. Functional space includes administrative space, emergency service, mental health, and occupational health services. The facility was last inventoried in August 2005. The two-story structure is constructed of steel and composite materials.

Building 5924 (Housing Supply and Storage)

The one-story structure was constructed in 1993 and contains a total of 5,500 ft². The facility is used for storage of supplies necessary for the upkeep of military family housing and dormitories. In addition to storage space, the building contains administrative space and latrines for the employees. The building is located adjacent to where the proposed new PFC is to be constructed. The facility was last inventoried in April 2004. The one-story structure is constructed of steel and composite materials.

Building 5927 (Dormitory Day Room)

The one-story structure was constructed in 1985 and contains a total of 3,219 ft². The facility is used as a lounge for several of the on-Base dormitories for unaccompanied military personnel. In addition to storage space, the building contains administrative space and latrines for the employees. The building is located in the area where the proposed new PFC parking

area is to be constructed. A facility use study conducted in May 1991 for the Tinker AFB Base Comprehensive Plan determined that the overall physical condition and functionally was in good condition. The facility was last inventoried in April 2004.

Exterior. Physically and functionally, the facility is in good condition. The primary and secondary structural components are in good condition. The HVAC is in good operating condition, and the electrical supply is adequate. Functionally, egress requirements appear to be met, and handicap accessibility is provided. The facility has no expansion capability.

The structural components of Building 5927 include a concrete foundation supporting a brick and block masonry-bearing wall. Precast concrete panel enclosures of exposed aggregate are used around the entrance. The roof framing is a steel bar joist system supporting a metal deck substrate.

The roof is an asphalt, built-up gravel surface system and does not have reported leaks. All related base wall flashings, gutters, and coping caps are in place.

The exterior doors are painted metal units that have no signs of deterioration with all hardware in place for proper usage.

The windows are aluminum frame, thermal pane units that are in good condition.

Interior. The lounge areas, kitchen, and recreation rooms are bright with all colors aesthetically balanced. All interior finishes appear in good condition and display a warm environment.

The separate laundry room is clean and bright with circulation uninhibited, and the ceramic tile finishes are easily maintained.

The restrooms have painted wall finishes that are clean with all fixtures and accessories in good condition. Handicap fixtures are provided.

Building 5937 (Gazabo)

The facility is located between Dormitories 5916 and 5920 and contains a sand volley ball court. The facility functions as a pavilion and was constructed around 1985. The open structure is wood framed with asphalt shingles and concrete foundation. The estimated size of the gazebo is approximately 1,000 ft².

Building 6004 (Gerrity Fitness Center)

The one-story structure was constructed in 1968 and contains a total of 38,719 ft². The gymnasium is used as a physical fitness center for use by military personnel, their dependents, and eligible civilian personnel. Building 6004 is located on McNarney Avenue and southeast of where the new parking area for the proposed new PFC is to be constructed. Functional space areas include latrines, showers, dressing rooms, sauna, and special indoor courts for squash, handball, racquet ball, and basketball. A large outdoor swimming pool is located adjacent to the facility. In addition to storage space, the building contains administrative space and latrines for the employees. The facility was last inventoried in June 1997.

2.4.2.1 Demolish Buildings

All the buildings within the footprint of the proposed project area (total of seven buildings), including the existing parking lot adjacent to McNarney Avenue, would be

demolished first. Under the Proposed Action, approximately 135,309 ft² of building space and 49,200 ft² of parking area would be demolished for a total of 184,509 ft². After construction of the new PFC and HAWC has been completed then Buildings 216 and 6004 would be demolished. It is estimated that demolition activities would take approximately 12 months. The contractor would prepare and implement a demolition plan that provides a phased approach to demolishing the facilities.

Soil under and immediately surrounding the buildings, except for Buildings 216 and 6004, may contain both chlordane (a termiticide) and lead (from LBP). The developer would take care during demolition to disturb as little of this soil as possible. Soil would not be removed from the site without appropriate environmental testing and written consent of the Tinker AFB Commander. The developer would insure all workers are aware of the potential presence of chlorinated pesticides and lead in the soil.

2.4.2.2 Construct PFC and HAWC

The new PFC facility would be 102,632 ft² (2.36 acres) in size and would house an Olympic size swimming pool, a running track, and a new HAWC within the facility, and a 73,800 ft² (1.69 acres) of parking area. The new PFC would contain the following amenities: men's restroom with eight toilets, eight urinals, six sinks, and 40 shower heads; women's restroom with 10 toilets, 10 sinks, and five showers; 5,000 ft² cardiovascular room; 8,000 ft² free-weight room; 5,000 ft² selectorized equipment room; two full-court basketball courts; three group exercise rooms (2,000 ft², 4,000 ft², and 6,000 ft²); six racquetball courts; indoor swimming pool; child play area; locker rooms; and HAWC.

It is estimated that there would be about 176,432 ft² ($102,632 + 73,800 = 176,432$), or 4.05 acres, of impervious cover for the proposed facility. The overall layout of streets adjacent to the PFC would not be altered to accommodate the layout of proposed facility; therefore, it is estimated that there would be no increase in the surface area of streets within the proposed project area. The total amount of impervious cover associated with the Proposed Action would be 34,092 ft² ($176,432 - 142,340 = 34,092$), or approximately 0.79 acres.

The proposed PFC, HAWC, and parking areas would be constructed at a minimum of approximately 700 feet east of the controlled Base perimeter along Sooner Road, which is well beyond the standoff distances established by UFC 4-010-01 (UFC 2007).

2.5 SELECTION OF THE PREFERRED ALTERNATIVE

The No Action Alternative does not meet the purpose and need of the action. Therefore, the Preferred Alternative is Alternative 2 - Proposed Action.

2.6 OTHER ACTIONS WITHIN THE REGION OF INFLUENCE

Complete environmental impact analysis of the Preferred Alternative must consider cumulative impacts due to other actions within the ROI. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Several other action projects that would occur during the time period associated with the Proposed Action and No Action Alternative are identified in Table 2.2. These projects were detailed in the 2005 General Plan for Tinker AFB (Tinker AFB 2005). These actions are not related to the Proposed Action and No Action Alternative evaluated in this EA, but are additional actions announced for the Base or the surrounding community. The environmental impacts of these additional actions have or will be analyzed in separate NEPA documents and are addressed in this EA only in the context of potential cumulative impacts, if any. Figure 2-1 shows the location of the other action projects.

Table 2.2 summarizes the estimated building sizes and impervious cover from construction and demolition activities for cumulative conditions. As a result of there being more demolition actions than construction actions, there is a net reduction in impervious cover of 31,775 ft² (80,000 – 111,775 = -31,775), or 0.73 acres. Additionally, the amount of building space to be constructed and demolished is 240,000 ft² and 241,800 ft², respectively, for a net reduction of 1,800 ft².

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS OF ALL ALTERNATIVES

Table 2.3 summarizes the impacts of the No Action Alternative and the Proposed Action.

2.8 MITIGATION

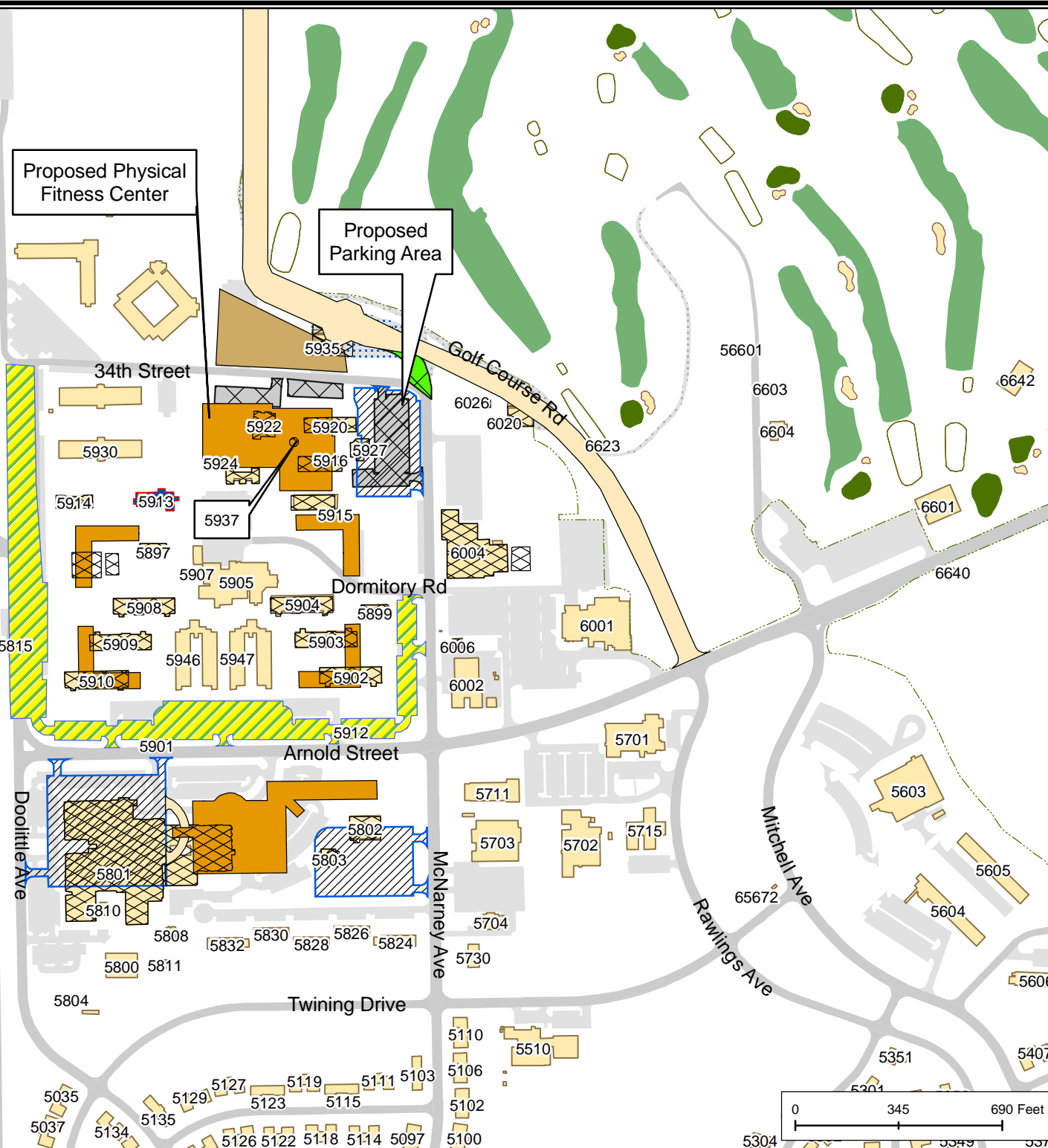
Best management practices are incorporated into the EA to minimize impacts.

Table 2.2 Other Actions Considered for Cumulative Impact Purposes

Construction/Demolition Project Title (Building)	Estimated Project Start Date	Footprint Construction (ft²)	Footprint Demolition (ft²)	Building Area Size (ft²)
Construct L – Shaped 3 Story Dormitory	TBD	20,000		60,000
Construct L – Shaped 3 Story Dormitory	TBD	20,000		60,000
Construct L – Shaped 3 Story Dormitory	TBD	20,000		60,000
Construct L – Shaped 3 Story Dormitory	TBD	20,000		60,000
Demolish parking lot north of Bldg 5920	TBD		9,000	-
Demolish parking lot north of Bldg 5922	TBD		11,825	-
Demolish Golf Maintenance Facility (6020)	TBD		4,125	4,125
Demolish Outdoor Recreation & Storage (5935)	TBD		8,000	8,000
Demolish 3 Story Dormitory (5908)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5909)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5910)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5904)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5903)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5902)	TBD		10,000	30,000
Demolish 3 Story Dormitory (5914)	TBD		10,000	30,000
Demolish 3 Story Building (5897)	TBD		3,825	11,475
Demolish 2 Story Building (5899)	TBD		3,200	6,400
Demolish 1 Story Building (6006)	TBD		1,800	1,800
Totals		80,000	111,775	481,800

Table 2.3 Summary of Environmental Impacts for the No Action Alternative and Proposed Action

Resource (Applicable Sections)	Alternative 1 No Action Alternative	Alternative 2 Construct Physical Fitness Center
Air (Section 4.1)	No significant impacts occur from the baseline activities.	No significant air quality impacts are expected.
Infrastructure and Utilities (Section 4.2)	No significant impacts occur from the baseline activities.	No significant impacts to infrastructure and utilities were identified.
Biological Resources (Section 4.3)	No significant impacts occur from the baseline activities.	The area of the Proposed Action is previously developed. No impacts to biological resources were identified.
Water Resources (Section 4.4)	No significant impacts occur from the baseline activities.	Storm water and erosion best management practices (BMP) would be utilized during construction to prevent soil erosion and siltation impacts to nearby waterbodies. No significant impacts to water resources were identified as a result of the Proposed Action.
Earth Resources (Section 4.5)	No significant impacts occur from the baseline activities.	The site of the Alternative 2 is relatively flat and previously developed; therefore, changes in topography are not expected. Geology would not change and soil disturbances would be minimal and of short-duration. However, it is anticipated the contractor would minimize disturbance of the topography and soil to retain as much of the natural setting as possible. The contractor would ensure a SWPPP is completed and approved before initiating activities. The plan would include BMPs for erosion control techniques.
Hazardous Materials and Waste (Section 4.6)	No significant impacts occur from the baseline activities.	Contractors will use and store hazardous materials in accordance with all federal, state, and local regulations. Any hazardous waste generated will be handled in accordance with all federal, state, and local laws and regulations, including existing Tinker AFB management programs. No significant impacts were identified.
Noise (Section 4.7)	No significant impacts occur from the baseline activities.	No impacts to cultural resources are expected. Procedures are in place that would be followed in the event of inadvertent discoveries of cultural resource materials or human remains during construction activities.
Land Use (Section 4.8)	No significant impacts occur from the baseline activities.	The area is previously developed. No significant impacts were identified as a result of the Proposed Action.



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CHAPTER 3

AFFECTED ENVIRONMENT

This chapter describes the existing environmental resources, either manmade or natural, that could be affected by or could affect the Proposed Action and the No Action Alternative. Only those specific resources relevant to the potential impacts are described in detail.

3.1 AIR QUALITY

3.1.1 Air Pollutants and Regulations

Air quality in any given region is measured by the concentration of various pollutants in the atmosphere, typically expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Air quality is not only determined by the types and quantities of atmospheric pollutants, but also by surface topography, size of the air basin, and by prevailing meteorological conditions.

The Clean Air Act (CAA), as amended in 1977 and 1990, provides the basis for regulating air pollution to the atmosphere. Different provisions of the CAA apply depending on where the source is located, which pollutants are being emitted, and in what amounts. The CAA required the USEPA to establish ambient ceilings for certain criteria pollutants. These criteria pollutants are usually referred to as the pollutants for which the USEPA has established National Ambient Air Quality Standards (NAAQS). The ceilings were based on the latest scientific information regarding the impacts a pollutant may have on public health or welfare. Subsequently, the USEPA promulgated regulations that set NAAQS. Two classes of standards were established: primary and secondary. Primary standards define levels of air quality necessary, with an adequate margin of safety, to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards define levels of air quality necessary to protect public welfare (*e.g.*, decreased visibility, damage to animals, crops, vegetation, wildlife, and buildings) from any known or anticipated adverse impacts of a pollutant.

Air quality standards are currently in place for six pollutants or "criteria" pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (SO_x , measured as sulfur dioxide [SO_2]), lead (Pb), and particulate matter with aerodynamic diameters less than or equal to 10 micrometers (PM_{10}) and 2.5 micrometers ($\text{PM}_{2.5}$). There are many suspended particles in the atmosphere with aerodynamic diameters larger than 10 micrometers. The collective of all particle sizes is commonly referred to as total suspended particulates (TSP). TSP is defined as particulate matter as measured by the methods outlined in 40 CFR Part 50, Appendix B. The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants USEPA determines may endanger public health or welfare.

Ozone (ground-level ozone), which is a major component of "smog," is a secondary pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly nitrogen oxides (NO_x) and volatile organic compounds (VOC). NO_x is the designation given to the group of all oxygenated nitrogen species, including nitric oxide (NO), NO_2 , nitrous oxide (N_2O), and others. However,

only NO, NO₂, and N₂O are found in appreciable quantities in the atmosphere. VOCs are organic compounds (containing at least carbon and hydrogen) that participate in photochemical reactions and include carbonaceous compounds except metallic carbonates, metallic carbides, ammonium carbonate, carbon dioxide (CO₂), and carbonic acid. Some VOCs are considered non-reactive under atmospheric conditions and include methane, ethane, and several other organic compounds.

As noted above, ozone is a secondary pollutant and is not directly emitted from common emissions sources. Therefore, to control ozone in the atmosphere, the effort is made to control NO_x and VOC emissions. For this reason, NO_x and VOCs emissions are calculated and reported in emission inventories.

The CAA does not make the NAAQS directly enforceable. However, the Act does require each state to promulgate a State Implementation Plan (SIP) that provides for “implementation, maintenance, and enforcement” of the NAAQS in each Air Quality Control Region (AQCR) in the state. The CAA also allows states to adopt air quality standards more stringent than the federal standards. In Oklahoma, state standards are established by the Oklahoma Department of Environmental Quality (ODEQ) and are at least as restrictive as the NAAQS. The national and state ambient air quality standards are presented in Table 3.1 (NAAQS 2009; ODEQ 2009a).

Based on the requirements outlined in USEPA’s general conformity rule published in 58 Federal Register 63214 (November 30, 1993) and codified at 40 CFR part 93, subpart B (for federal agencies), a conformity analysis is required to analyze whether the applicable criteria air pollutant emissions associated with the project equal or exceed the threshold emission limits that trigger the need to conduct a formal conformity determination. The intent of the conformity rule is to encourage long range planning by evaluating the air quality impacts from federal actions before the projects are undertaken. This rule establishes an elaborate process for analyzing and determining whether a proposed project in a nonattainment area conforms to the SIP and federal standards.

Table 3.1 National and Oklahoma Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	National Standards ^a		Oklahoma Standards ^a	
		Primary NAAQS ^{b,c}	Secondary NAAQS ^{b,d}	Primary NAAQS ^{b,c}	Secondary NAAQS ^{b,d}
Carbon Monoxide	8-hour	9 ppm (10,000 µg/m ³)	No standard	9 ppm (10,000 µg/m ³)	No standard
	1-hour	35 ppm (40,000 µg/m ³)	No standard	35 ppm (40,000 µg/m ³)	No standard
Lead	Rolling 3-month ^e	0.15 µg/m ³	0.15 µg/m ³	No standard	No standard
	Quarterly average	1.5 µg/m ³	1.5 µg/m ³	1.5 µg/m ³ (max.) ^f	No standard
Nitrogen Oxides (measured as NO ₂)	Annual (arithmetic mean)	0.053 ppm (100 µg/m ³)	0.053 ppm (100 µg/m ³)	0.053 ppm (100 µg/m ³)	No standard
Ozone ^g	8-hour ^h	0.075 ppm (147 µg/m ³)	0.075 ppm (147 µg/m ³)	0.08 ppm (147 µg/m ³)	0.08 ppm (147 µg/m ³)
	1-hour	0.12 ppm (235 µg/m ³)	0.12 ppm (235 µg/m ³)	0.12 ppm (235 µg/m ³)	0.12 ppm (235 µg/m ³)
Particulate Matter (measured as PM ₁₀)	Annual (arithmetic mean) ⁱ	Revoked	Revoked	Revoked	Revoked
	24-hour ^j	150 µg/m ³	150 µg/m ³	150 µg/m ³	150 µg/m ³
Particulate Matter (measured as PM _{2.5})	Annual ^k	15 µg/m ³	15 µg/m ³	15 µg/m ³	15 µg/m ³
	24-hour ^l	35 µg/m ³	35 µg/m ³	35 µg/m ³	35 µg/m ³
Sulfur Oxides (measured as SO ₂)	Annual	0.03 ppm (80 µg/m ³)	No standard	0.03 ppm [†] (80 µg/m ³)	No standard
	24-hour	0.14 ppm (365 µg/m ³)	No standard	0.14 ppm (365 µg/m ³)	No standard
	3-hour	No standard	0.50 ppm (1300 µg/m ³)	No standard	0.50 ppm (1300 µg/m ³)

^a National and state standards, other than those based on an annual or quarterly arithmetic mean, are not to be exceeded more than once per year.

^b Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

^c National Primary Standards: The levels of air quality necessary to protect the public health with an adequate margin of safety. Each state must attain the primary standards no later than three years after the state implementation plan is approved by the USEPA.

^d National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse impacts of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the state implementation plan is approved by the USEPA.

^e Rolling 3-month average for lead, as outlined in 40 CFR part 50, National Ambient Air Quality Standards, <http://www.epa.gov/air/criteria.htm>, final rule signed October 15, 2008.

^f Never to be exceeded.

^g The ozone 1-hour standard is included for information only and applies only in limited areas. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1. As of June 15, 2005, EPA revoked the 1-hour ozone standard in all except the 8-hour ozone nonattainment Early Action Compact Areas. It was revoked for all Oklahoma counties on December 29, 1997.

^h To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

ⁱ Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, the EPA revoked the annual PM₁₀ standard, effective December 17, 2006.

^j Not to be exceeded by the 3-year average of the annual mean concentrations.

^k To attain this standard, the 3-year average of the weighted annual mean concentrations from single or multiple community-oriented monitors

^l Not to be exceeded by the 3-year average of the annual 98th percentile concentrations.

3.1.2 Regional Air Quality

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as “attainment” or “nonattainment.” Based on the NAAQS, each state is divided into three types of areas for each of the criteria pollutants. The areas are:

- Those areas in compliance with the NAAQS (attainment);
- Those areas that do not meet ambient air quality standards (nonattainment); and
- Those areas where a determination of attainment/nonattainment cannot be made due to a lack of monitoring data (unclassifiable – treated as attainment until proven otherwise).

Generally, areas in violation of one or more of the NAAQS are designated nonattainment and must comply with stringent restrictions until all the standards are met. In the case of O₃, CO, and PM₁₀, USEPA divides nonattainment areas into different categories depending on the severity of the problem in each area. Each nonattainment category has a separate deadline for attainment and a different set of control requirements under the SIP.

The ODEQ has several monitoring stations located throughout the state to monitor ambient air quality. Regional ambient air monitoring data show the Oklahoma City area to be currently in attainment of the NAAQS for all pollutants. These monitoring stations measure representative air quality conditions in the metropolitan area.

Tinker AFB is located in Oklahoma County within the Central Oklahoma Intrastate AQCR 184. The ODEQ has regulatory authority for air pollution control in the State of Oklahoma. Canadian, Cleveland, Grady, Kingfisher, Lincoln, Logan, McClain, Oklahoma, and Pottawatomie Counties comprise the Central Oklahoma Intrastate AQCR 184. According to federal regulations (40 CFR 81.337), all nine counties in the AQCR are better than national standards for the criteria air pollutants, or are unclassifiable/attainment (Electronic Code of Federal Regulation [ECFR] 2009).

3.1.3 Baseline Air Emissions

An air emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period of time, typically a year. Accurate air emissions inventories are needed for estimating the relationship between emissions sources and air quality. Quantities of air pollutants are generally measured in pounds (lbs) per year or tons per year (tpy). All emission sources may be categorized as either stationary or area emission sources. Stationary source, or point source, emissions are those air pollutants emitted from identified utility, industrial, institutional and commercial facilities operating at fixed locations. Area source emissions are those air pollutants emitted from many individually small activities such as gasoline service stations, small paint shops, and consumer use of solvents. Area sources also include open burning associated with agriculture, forest management, land clearing activities, and mobile sources such as vehicle operations. Most recent CY 2005 and CY 2008 air emissions inventory summary for the Central Oklahoma Intrastate AQCR 184 is presented in Table 3.2. This summary includes reported emissions totals from area and point sources within AQCR 184.

Table 3.2 Baseline Air Emissions

Criteria Air Pollutant	CO (TPY)	VOC (TPY)	NO _x (TPY)	SO _x (TPY)	PM ₁₀ (TPY)	PM _{2.5} (TPY)
AQCR CY 05 Totals:	496,089	87,251	82,366	3,781	121,823	17,789

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an ozone precursor, it is a controlled pollutant.

Source: AIRData 2009. Data information comes from USEPA's National Emission Inventory database. Data extracted in August 2005 (1999 emissions) and August 2008 (2002 emissions)

3.2 INFRASTRUCTURE AND UTILITIES

3.2.1 Energy

The 30 percent energy efficiency goals set forth in EO 13423 seeks to achieve in 10 years the same level of improvement that federal agencies achieved in the last 20 years and is 50 percent more stringent than the goal set by the Energy Policy Act of 2005. The federal government improved energy efficiency 29.6 percent between 1985 and 2005 (Office of the Federal Environmental Executive 2007).

Tinker AFB currently has programs in place that will help achieve the goals of EO 13423, including installing 159 advanced electrical meters that provide increased energy usage visibility/accountability to Base organizations and facilitate conservation culture, increase accuracy in energy reimbursable billings, and enhance capabilities to provide a means for informed energy management decisions. Tinker AFB is also in the process of replacing light bulbs throughout Base facilities with more energy efficient compact fluorescent lamps, and so far has replaced over 900 light bulbs (Bradshaw 2009). Figure 3-1 shows the location of existing utilities in the area of the Proposed Action.

Tinker AFB has several on-going natural gas optimization projects that will reduce usage of natural gas on the Base by 500,000 million British Thermal units (expressed as MBtu) and a savings of \$8 million. Some of these Energy Savings Performance Contract (ESPC) projects include summer decentralization of CSP at Area A central steam plant, Navy/Alert area steam decentralization, elimination of aged distribution system at, decentralization of three central steam plants, optimization of Building 3001 central stream plant, and utilization of landfill gas for usage at the TAC facility (Bradshaw 2009).

Tinker AFB is finalizing an agreement with Oklahoma Gas and Electric (OG&E) to purchase additional renewable wind energy credits that will save the Base between 16.14 to 48.6 thousand kilowatt hours (kWH) of electricity thereby allowing the Base to achieve the EAct 2005 goal for FY13 in FY09. Currently, Tinker AFB is achieving a 2.54 percent EAct 2005 goal the OG&E Centennial Wind Project (Bradshaw 2009).

Electrical power is supplied to the Base by a public utility company through two feeder lines. OG&E provides electricity to the main Base area and the MFH area. Most recent available Base records indicate that the Base consumes about 9,024,168 kWH of electricity, or about 24,724 kWH per day (84.3 MBtu per day). The system capacity is approximately 300,805,600 kWH or 824,123 kWH per day (2,810 MBtu per day). Therefore, the Base uses about three percent of the system capacity. Tinker AFB has approximately 15.2 million ft² of building space on Base. Based on the annual electricity consumption, the 15.2 million ft² of

building space, and 365 days per year, electricity consumption is 0.00163 kWh per ft² per day (0.00000556 MBtu per ft² per day).

All natural gas for Tinker AFB is supplied by Geary Energy and delivered by Oklahoma Natural Gas (ONG) Company. Tinker AFB purchases natural gas through a contract administered by the Defense Energy Support Center. The ONG delivers natural gas to the Base at three metered delivery points (USAF 2008). The system capacity is based on demand, which is approximately 542 MBtu per day. The most recent metered natural gas usage for the Base was approximately 48,218 MBtu or about 132.1 MBtu per day, which is about 24 percent of the system capacity. Based on the annual natural gas consumption, the square feet of building space on Base, and 365 days per year, natural gas consumption is 0.00000869 MBtu per square foot per day.

Natural gas pressure on the south side of the Base fluctuates during periods of high demand due to pressure differences caused by not having a looped natural gas distribution system. There is sufficient natural gas supply to meet existing needs and provide for future expansion; however, the system is deteriorating due to age and portions are in need of major repair or replacements. Many of the gas mains were constructed in the early 1940s and have been in continuous service since this date. The majority of the joints are cast iron with lead/oakum joints that are particularly susceptible to corrosion, and most are severely corroded. Corrosion is a major cause of gas main leaks. Gas main leaks pose a real fire and explosive danger if emitted in a closed environment. Corroding lines will continue to deteriorate and increase the potential for natural gas supply stoppage, due to line failure (USAF 2005).

3.2.2 Storm Water Management

Tinker AFB has a large area of impervious cover. Buildings account for 470.1 acres of this amount. Roadways and parking areas account for approximately 900 acres of impervious cover, and airfield pavement contributes 545.5 acres of impervious cover. Total impervious cover for the Base is approximately 1,915 acres. Generally, rainfall events can cause significant problems with surface water flow on Tinker AFB due to poor percolation qualities of the soil (Tinker AFB 2005). To the north of the proposed project site there is a storm water drainage system that is a combination of natural and man-made features. Man-made features include curbs, gutters, culverts, and pipes. These structures in the northwest and southwest portions of the Base convey storm water to Crutch Creek. Structures in the north central portion of the Base convey storm water to Kuhlman Creek. The majority of storm water on the eastern side of the Base is conveyed to Soldier Creek.

3.2.3 Solid Waste Management

Municipal solid waste (MSW) management at Tinker AFB is managed in accordance to the guidelines specified in AFI 32-7042, *Solid and Hazardous Waste Compliance*. The instruction incorporates by reference the requirements of Subtitle D, 40 CFR Parts 240 through 244, 257, and 258, and other applicable federal regulations, AFIs, and DoD Directives (DoDD). In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program to incorporate the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention. An Integrated Solid Waste Management Plan (ISWMP) was prepared for the Base to provide a single reference for the management of solid waste at the Base. The

Environmental Management Directorate provides program management for the Tinker AFB ISWMP.

Tinker AFB generated 7,500 tons of MSW during FY 2008, an average of 20.5 tons per day. Solid waste generated by the Base is collected by a contractor and hauled to the Southeast Landfill for disposal. The Southeast Landfill is owned and operated by Allied Waste Industries. Construction and demolition debris from the Base is also disposed in the Southeast Landfill. Family housing residents separate recyclable materials and set them at the curbside for pickup by Base recycling personnel. Additionally, recycling bins are located around the Base for drop-off.

The State of Oklahoma permitted the Southeast Landfill for disposal of MSW under permit number 3555028, which is good for the life of the site. Currently, there are no plans to expand the landfill; however, adjacent undeveloped property is available for future expansion. In December 2005, Allied Waste Industries reported the capacity of the landfill would be reached in approximately 22 years (City of Oklahoma City 2007). Annual disposal for 2006, 2007, and 2008 were 444,451, 563,259, and 604,791 tons, respectively (ODEQ 2009b). The average daily disposal for a 260-day year and 537,500 tons (the annual average for the three years) is 2,067 tons per day.

3.2.4 Transportation

Several high capacity transportation routes provide direct access to the Base. The Oklahoma City region is served by Interstate 40 and Interstate 35. Interstate 40 runs parallel to 29th Street along the northern boundary of the Base. Interstate 240 runs east to west just south of the Base boundary. Douglas Boulevard, a four lane arterial street, forms the eastern boundary of the main Base. Sooner Road, another four lane arterial, defines the western boundary of the Base as well as the western boundary for both Twining Fields and McNarney Manor neighborhoods. Sooner Road runs north to south between Interstate 40 and Interstate 240. These high capacity transportation routes provide direct access to the Base via Tinker, Hickory, and Eaker Gates. Traffic enters Tinker AFB through six main gates as describes below.

- Tinker Gate (Gate 1), SE 29th Street and Air Depot Boulevard;
- Eaker Gate (Gate 2), SE 29th Street and “F” Avenue;
- Lancer Gate (Gate 20), Bradley Drive and Douglas Boulevard;
- Gott Gate (Gate 34), SE 59th Street and Air Depot Boulevard;
- Vance Gate (Gate 40), Sooner Road and Doolittle Avenue; and
- Hope Gate (38th EIW), SE 59th Street and Hilltop Road.

Several additional gates are open on a part time basis to facilitate traffic flow during peak times. Stacking at Tinker, Eaker, and Lancer Gates create significant traffic congestion during peak morning and afternoon traffic times. Tinker, Gott, and Lancer Gates are the most active gates and operate 24-hours per day. Eaker and Vance Gates operate only during peak traffic periods in the morning and afternoon.

The Base has a network of roads and streets, which, for the most part, are laid-out on a north-south grid. There are primary roads as main distributing arteries for all traffic originating

from outside and within the Base. The primary roads are Air Depot Boulevard, East Drive, Arnold Street, and Perimeter Road/Industrial Boulevard, also known as Patrol Road.

There are numerous secondary roads and streets that have two and three travel lanes supplementing the primary system by providing access to, through, and within the installations functional areas. The tertiary streets with at least two travel lanes provide access from other roads and streets to individual units and organizations within their functional areas. In addition, there are a limited number of security patrol roads inside the Base.

Generally, the off-Base transportation systems adequately support Tinker AFB. Local municipalities propose no significant short-range modifications to the existing network. Several long-range street and highway improvements are identified in the Tinker AFB General Plan. These improvements are projected for 2006-2020 and include the expansion of SE 59th Street from two to four lanes from Douglas Boulevard to Choctaw Road, and the expansion of Sooner Road from four to six lanes (Tinker AFB 2005).

Since the mid to late 1991, the growth rate has been relatively flat, and in most cases, has actually decreased on Base. It is assumed that traffic patterns and volumes in the vicinity of the Building 3001 and the TAC areas have remained relatively constant over the past several years. In general, the morning peak occurs from 0700 to 0800 hours, and evening peak is from 1600 to 1700 hours (Tinker AFB 2005).

The existing PFC facility (Building 216) is accessible via Sentry Road or Arnold Street, between Avenues D and F. Buildings 5915, 5916, 5920, 5922, 5924, 5927, 5937, and 6004 are accessible via Arnold Street and McNarney Avenue in the northeast portion of the Base.

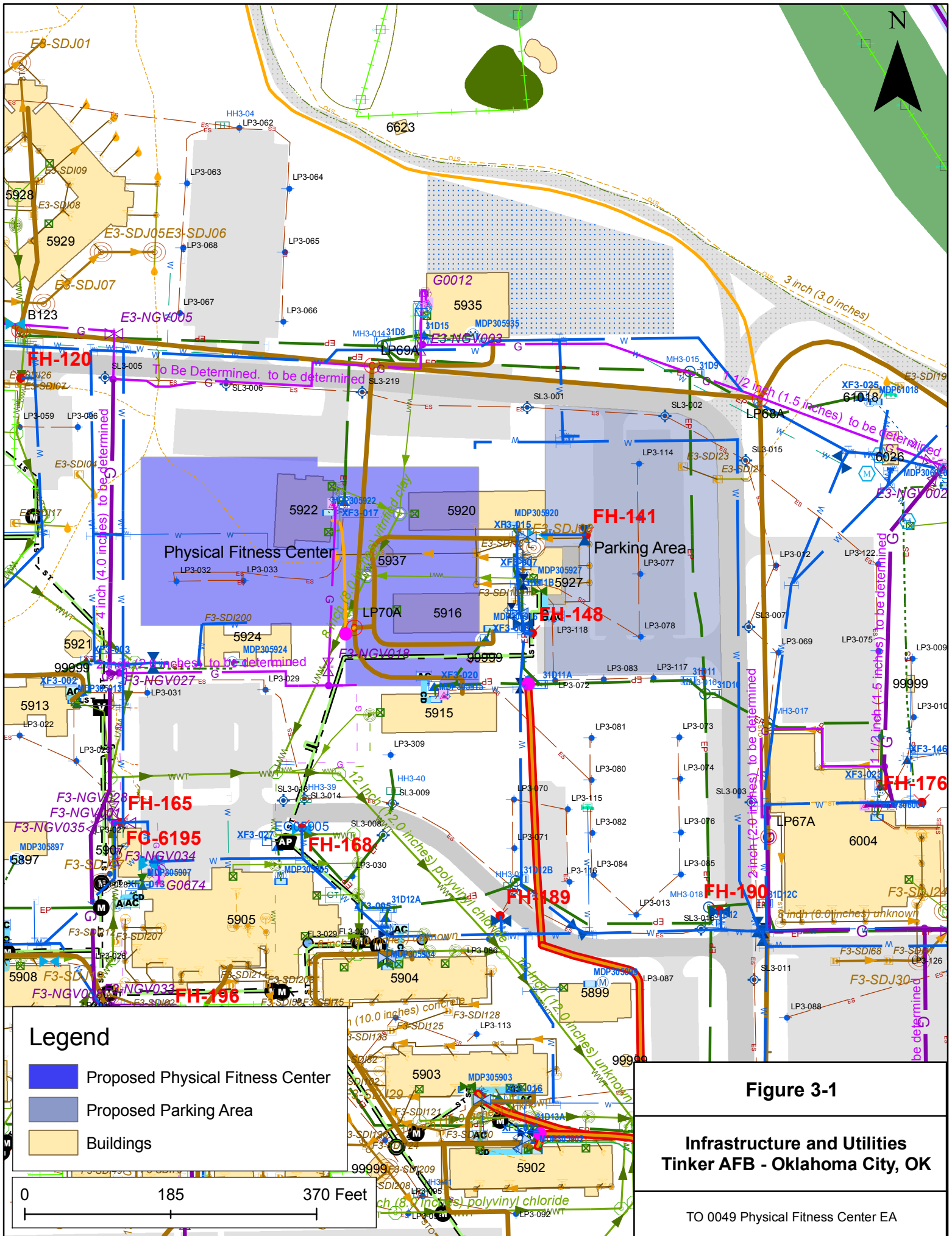
3.3 BIOLOGICAL RESOURCES

3.3.1 Wildlife and Vegetation

Tinker AFB is classified into three wildlife management areas (WMA): WMA 1, 2, and 3 (Tinker AFB 2005). Figure 3-1 shows the locations of the WMAs relative to the Proposed Action. The use of this classification system is helpful in achieving the goals of the Integrated Natural Resources Management Program (INRMP).

Watchable wildlife at Tinker AFB includes songbirds and small mammals. Larger animals, including deer and geese, increase the danger for aircraft strikes and are therefore discouraged from occupying the Base (Tinker AFB 2005). Several flocks of Canada geese (*Branta canadensis*) frequently feed at the Base golf course. However, they are discouraged from using the Base because they pose a threat to aircraft operations.

A number of fur-bearing species inhabit Tinker AFB. Terrestrial furbearers include the coyote, skunk, raccoon, opossum, and beaver. Human-wildlife conflicts are not uncommon at Tinker AFB. Beaver dam building has damaged ornamental trees, caused flooding problems, and disabled spill gates. Skunks provide a nuisance to personnel and residents, and coyotes pose an aircraft hazard (Tinker AFB 2005).



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Grasslands on Tinker AFB vary wildly in species composition. Most sites are dominated by introduced species such as KR bluestem (*Bothriochloa ischaemum*), bermudagrass (*Cynodon dactylon*), and fescue (*Festuca arundinacea*). The predominance of non-native grasses indicates that these areas were planted with these species, and may have been used for grazing or hay production. Sites not dominated by a particular introduced species tend to be very mixed. Common native grass species include silver bluestem (*Bothriochloa saccharoides*), switchgrass (*Panicum virgatum*), little bluestem (*Schyzachyrium scoparium*), and sideoats grama (*Bouteloua curtipendula*) (Parsons 2002).

The riparian vegetation community in the area around Tinker AFB contains such species as American elm (*Ulmus Americana*), slippery elm (*Ulmus rubra*), hackberry (*Celtis* spp.), and cottonwood (*Populus deltoids*) (Parsons 2002). Riparian areas occur adjacent to stream or drainage channels or in low-lying areas where water availability is relatively greater than the surrounding landscape. In the upland forest, the dominant plant species are deciduous or evergreen trees. The crowns are closed, or nearly so (greater than 60% canopy cover) (Hoagland 2000; Texas Parks and Wildlife Department 1995), and the trees are generally over 30 feet tall (Texas Parks and Wildlife Department 1995).

3.3.2 Endangered, Threatened, and Special Status Species

No state or federal plant species of concern, or proposed/listed threatened or endangered plant species are found on Tinker AFB. However, rare plant species do occur on Base, including the Oklahoma penstemon and Powdery thalia. The Oklahoma penstemon, classified as rare under the Oklahoma Natural Heritage Inventory Program, is found at numerous locations on the Base. This cool season forb has a global ranking of G3 (either very rare and local throughout its range, or found locally, even abundantly at some of its locations, in a restricted range, or because of other factors making it vulnerable to extinction throughout its range; in the range of 21 to 100 occurrences). The Powdery thalia is found only as a single plant in Prairie Pond (Tinker AFB 2007). There are several sensitive species that occur on Tinker AFB. The Texas horned lizard (*Phrynosoma cornutum*), barn owl (*Tyto alba*), Swainson's hawk (*Buteo swainsoni*), the Burrowing owl (*Athene cunicularia*), and the Migrant loggerhead shrike (*Lanius ludovicianus migrans*) are listed as Oklahoma State Species of Concern (Tinker AFB 2007). Air Force Regulation 126-1 states that species having such a status should be considered in future planning and facility siting as well as provided protection wherever possible.

The Barn owl has been observed primarily on the northeast side of the Base. Of special note, shrikes of the species *Lanius ludovicianus* do occur on Tinker, with the migrant race, listed previously, (*migrans*) potentially occurring (Tinker AFB 2007). The Texas horned lizard occurs primarily in the undeveloped areas southwest portion of the Base (Tinker AFB 2005).

3.4 WATER RESOURCES

3.4.1 Surface Water

Tinker AFB is a highly developed Base. As a result, a significant percentage of the original hydrology has been modified. Changes include channelization of some streams and diverting run-off into storm sewers. Low order streams characterize the *in situ* surface hydrology on the Base. Since the Base straddles a drainage divide, most of these streams

originate on-Base. Crutch Creek is the primary drainage on the Base. Crutch Creek flows northwest into the North Canadian River. Kuhlman Creek is a part of Crutch Creek drainage basin. Solider Creek also drains to the North Canadian River. The other two major drainages on the Base are Elm Creek and Hog Creek, both of which flow south off Base and join the Little River. The on-Base length of these streams is approximately 8 miles. Both north and south draining streams are part of the greater Arkansas River watershed.

There are numerous man-made retention ponds on the Base constructed to control storm water runoff, enhance wildlife habitat, and promote fishing opportunities and other benefits. A 10-acre retention basin is located adjacent to Landfill 5, northeast of the Navy Annex. Fire Pond located adjacent to the airfield is used for retention. On-Base creeks and water bodies are shown in Figure 3-2.

Heavy rainfall events that cause stream banks to overflow and result in localized flooding in adjacent areas are constraints to development. Therefore, development within the flood-prone areas on Base should be avoided where possible or the adverse effects appropriately identified and mitigated. Future development in areas adjacent to lakes, ponds, and streams on the Base has the potential of negatively affecting surface water and drainage systems, generating constraints in terms of groundwater protection and increased siltation due to excessive surface runoff from developed areas. Development in these areas is required to be designed in a manner that limits the increase in storm water runoff and maintains the existing storm water runoff coefficient. The Base is required to maintain the existing storm water coefficient to the maximum extent practicable (Tinker AFB 2005).

3.4.2 Wetlands and Floodplains

Wetlands

In 1995, approximately 65 acres of wetlands were identified on Tinker AFB by the USFWS using National Wetlands Inventory criteria. This included creeks, ponds, drainage swales, and other wet areas. Of the 65 acres, 7.6 acres were later classified by the U.S. Army Corps of Engineers (USACE) as jurisdictional wetlands under the Clean Water Act. The 7.6 acres were divided among four wetlands areas: groundwater treatment plant (GWTP) wetland (0.5 acres); Fuel Control Facility Wetland (0.8 acres); Greenway Wetland (4.8 acres); and the Glenwood Wetland (1.5 acres, on-Base portion only). This excludes the off-Base portion (8.5 acres) of the Glenwood wetland, which was located adjacent to the east side of the Base on county and private land. The 0.3-acre wetland, identified as the Compressed Natural Gas Wetland, is regulated under EO 1190 and is not jurisdictional. On-Base wetlands are shown in Figure 3-2.

Discharging dredge or fill material into wetlands and waters of the United States is regulated by USACE under Section 404 of the Clean Water Act. Disturbance of wetlands by federal activities is further regulated by EO 11990 for the preservation of wetlands. There are no wetlands in the vicinity of the Proposed Action.

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Floodplains

In October 2002, USACE, Southwestern Division - Tulsa District, completed a special study for Tinker AFB to update the 100-year and 500-year floodplains (Tinker AFB 2002b). The 100-year and 500-year floodplains were reassessed for the Middle Branch, Upper Crutcho Creek (the Eastern Branch), and Upper Crutcho Creek (Western Branch). The most current 100-year floodplain in the area of Alternatives 2 and 3 is shown in Figure 3-2. While no Federal Emergency Management Agency-designated floodplains exist along the smaller, intermittent streams that exist on the Base, the Soil Conservation Service has classified the soil in many of these areas as “flood-prone.”

The definition of floodplain is the land area adjacent to a river, stream, lake, estuary or other water body subject to flooding. A floodway is the channel of a river, stream, or creek and the portion of the floodplain that carries most of the flood flow. Floodways are usually the area where water velocities and forces are the greatest and most destructive. The National Flood Insurance Program (NFIP) definition of floodway is “...the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the Base flood (100-year flood event) without cumulatively increasing the water surface elevation more than one foot.” NFIP regulations, adopted in local ordinances, require that a floodway be kept open so flood flows are not obstructed or diverted onto other properties.

The Proposed Action is not located in the 100-year floodplain.

3.5 EARTH RESOURCES

Tinker AFB is located in the Central Redbed Plains section of the Central Lowland Physiographic Province characterized by gently rolling hills, broad flat plains, and bottomlands bisected by small- to medium-sized water courses. Oklahoma County elevations range from about 850 feet above mean sea level (msl) in the southeastern part to 1300 feet msl in the northwestern part. Base elevations range from approximately 1200 msl at Crutcho Creek in the northwestern portion of the Base to 1310 feet msl in the southeast portion of the Base. The airfield elevation is approximately 1291 feet msl (Tinker AFB 2005).

3.5.1 Geology

A 1988 USACE report stated the Garber-Wellington Formation underlies the entire Base, but is overlapped by the Hennessey Group at the southern half of the Base. Recent drilling of wells and construction of geological cross-sections (a visual representation of the underlying strata along a designated section line) confirm that the erosion edge of the Hennessey group extends from the northwest corner of the Base southeastward to the 38th EIW District. Over three-fourths of the Base surface geology is Hennessey. Most of the remaining surface geology is Garber Sandstone with some alluvium along streams. Recent work shows that the Hennessey at the surface is underlain by Garber Sandstone which, in turn, is underlain by the Wellington formation. Surface geology at the Base is composed primarily of sandstone and shale. The sandstone is orange-red to reddish-brown in color and fine-grained with a poor cement bond. The grains are sub-angular to sub-rounded and composed of quartz. The shale is reddish-brown and silt-like (Tinker AFB 2005).

3.5.2 Soil

A soil survey of the Base was completed in 1983 and updated in 1991 by the United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS). Forty-two soil types were identified within Base boundaries. Eighty-nine acres were classified as prime farmland, defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. At the time Tinker AFB was surveyed, most land (approximately 300 acres) that would have been designated prime farmland had long since been urbanized and, therefore, no longer met prime farmland criteria.

According to the USDA NRCS, the soil at Tinker AFB comprises three major associations. The Darnell-Stephenville association is characterized by shallow to deep, light-colored sandy upland soil with reddish subsoil under oak-hickory forest with prairie openings. Areas are gently to moderately sloped with some areas strongly sloped. The Renthin-Vernon-Bethany association consists of shallow to deep, dark, loamy upland soil with clayey subsoil under tall grass. Sloping varies from nearly level to moderately steep. The Dale-Canadian-Port association consists of deep, loamy alluvial soil located in bottomlands along water courses.

Over the years, soil properties have been changed greatly by urban activities. Topsoil has been removed at some locations and not replaced. Soil compaction is commonplace as the result of off-road training exercises, military construction projects, past aircraft parking on the airfield and related activities.

3.6 HAZARDOUS MATERIALS AND WASTE

3.6.1 Hazardous Materials

Hazardous materials (HM) are those substances defined by the U.S. Department of Transportation (USDOT) (49 CFR 105.5). The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (42 United States Code [USC] 6901, *et seq.*), and further amended by the Hazardous and Solid Waste Amendments of 1984, defines hazardous waste (HW). In general, both hazardous materials and hazardous waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or to the environment when released or otherwise improperly managed.

Management of HMs at Air Force installations is established primarily by AFI 32-7086, HAZMAT Management. The AFI incorporates requirements of all federal regulations, including the Toxic Substance Control Act, Occupational Safety and Health Administration, Community Right-to-Know Act, and Air Force Occupational Safety and Health Standards for hazardous material reduction, use, purchasing, managing, and tracking of HMs on Tinker AFB.

Current operations at Tinker AFB require the use of HMs in varying quantities. HMs are used by military personnel and on-Base contractors throughout the Base. The location of HMs, procedures and equipment at Tinker AFB used to prevent and clean up a release, and actions to be taken in the event of a release are located in the Tinker AFB Spill Prevention Control and Countermeasures Plan.

The use of HMs on Tinker AFB must be authorized by the Base's Hazmat Pharmacy Program. The HMs management program applies to all Base activities, including contractors,

and operating locations. The Environmental Compliance Operations Branch (EMCO) is responsible for managing HMs and waste and for complying with all Air Force guidelines, USEPA, and Oklahoma State regulations. No HM may be used until it is entered into the Hazardous Materials Management System, approved for use, and issued a serial tracking label. Under this system, EMCO personnel maintain positive records for the location of the containers, from issue to return, and ultimate disposal.

The Base's HMs planning and response plan is an integrated plan titled "OC-ALC Plan 19-2 (*Tinker AFB Spill Prevention and Emergency Response Plan for Hazardous and Extremely Hazardous Substances*)."

 The plan covers the requirements for handling oil, hazardous substances, extremely hazardous materials/substances, HMs emergency planning, training, response, and reporting and would be used to respond to spills on the Base.

3.6.2 Asbestos Containing Materials

Asbestos management at Air Force installations is established in AFI 32-1052, *Facility Asbestos Management*. AFI 32-1052 incorporates by reference applicable requirements of 29 CFR 669 *et seq.*, 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.140, Section 112 of the CAA, and other applicable AFIs and DoD Directives. AFI 32-1052 requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the current status and condition of all ACM in the Base's facility inventory and documenting all asbestos management efforts. In addition, the instruction requires installations to develop an asbestos-operating plan that details how the Base will conduct asbestos-related projects. Asbestos is regulated by the USEPA, which gets its authority from the Toxic Substances Control Act and the Clean Air Act. Emissions of asbestos fibers to ambient air are regulated under Section 112 of the Clean Air Act.

The asbestos program at Tinker AFB is managed by the Civil Engineering group. The Base has a database of all known asbestos identified through sampling during renovation projects and all known ACM in any given building.

The Base hires and uses qualified contractors to perform abatement and removal when applicable and follows an Asbestos Management and Operations Plan. The plan details procedures for notification, record keeping, protection, and abatement associated with ACM. The Asbestos Management and Operations Plan ensures that Tinker AFB is in compliance with all ACM related federal, state, and local regulations. ACM is potentially present in floor tile adhesive, roof patching sealant, wall board in mechanical closets, wall and ceiling texture, wall board panels, pipe insulation, and cement pipe.

The Asbestos Management and Operation Plan in place at Tinker AFB would be applied at the Proposed Action facilities. The plan details procedures for notification, record keeping, protection, and abatement associated with ACM. The Asbestos Management and Operation Plan ensures that Tinker AFB is in compliance with all ACM related federal, state, and local regulations (USAF 2007).

3.6.3 Lead-based Paint

Lead-based paint management at Air Force installations is established in the Air Force policy and guidance on LBP in facilities. The policy incorporates by reference the requirements of 29 CFR 1910.1025, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280,

the Clean Air Act, Public Law 102-550, and other applicable federal regulations. This policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards.

The use of LBP declined after 1978 when the Consumer Product Safety Commission lowered the allowable lead content in paint to 0.06 percent by weight (trace amount) from its 1973 level of 0.5 percent by weight in a dry film of newly applied paint. This change was made under the Consumer Safety Act of 1977, Public Law 101-608, as implemented by 16 CFR Part 1303. DoD implemented a ban of LBP use in 1978. Buildings 216 and 5915 were constructed prior to 1979. The full extent of LBP contamination in these building is not known but it suspected that some LBP exists in the facilities.

Tinker AFB has a LBP Management Plan and currently maintains a database related to the limited LBP surveys conducted on-Base. The database currently contains information from LBP surveys and sampling conducted during and after 1994. The LBP Management Plan establishes responsibilities, procedures for assessing risk, hazard management and risk reduction, medical screening, record keeping, and waste disposal requirements, and provides for capture and removal of LBP scrapings or dust. Historic painting activities did not include capture and proper disposal of paint scrapings or dust; therefore, it is possible that the soil in areas where LBP was used may exhibit elevated concentrations of lead.

3.6.4 Pesticides

The Pesticide Management Program at Tinker AFB is managed by the Pest Management Shop and the main bulk storage facilities for pesticides are located at Building 1049, the Pest Management Shop, and Building 6020, Golf Course Pesticide Shop. Pesticide application is routinely performed by contract. Commercially available pesticides and herbicides are applied as needed along roadways, fire breaks, and pre-determined locations (spot applications) throughout Tinker AFB. Application and use of these and all pesticides and herbicides is done in accordance with the Integrated Pest Control Management Plan (USAF 2007).

Historic pesticide applications have occurred throughout Tinker AFB on landscaped areas on a limited basis. Historical pesticides included diazinon, allethrin, chlordane, and pyrethrin-based products. These products were used within appropriate guidelines for application at the time that they were used. Historically, chlordane was injected beneath foundations of buildings when termite infestations were observed. Due to the persistence of chlordane in the environment, it is likely that concentrations of chlordane may be present in soil (USAF 2007).

3.6.5 Hazardous Waste

As previously stated in subchapter 3.6.1, HWs are defined by the Solid Waste Disposal Act RCRA Subtitle C (40 CFR, Parts 260 through 270). The USEPA regulatory authority is delegated to the state of Oklahoma under identification number OK1571724391. HW management at Tinker AFB is also regulated under AFI 32-7013, *Hazardous Waste Management and Minimization*. These regulations are implemented through HW permitting procedures and the Tinker AFB Hazardous Waste Management Instruction, OC-ALC-TAFB

Instruction 32-7004. HW must be handled, stored, transported, disposed, or recycled in accordance with these regulations.

Tinker AFB has a RCRA Part B Permit to operate a Hazardous Waste Storage Facility (HWSF) and manage corrective action at solid waste management units under the Hazardous and Solid Waste Amendments for 1984 issued for a 10-year period by ODEQ. Up to 158,796 gallons of hazardous waste can be stored on Tinker AFB in the permitted facility (Tinker AFB 2002c). The HWSF in Building 810 was constructed to temporarily house hazardous waste for a period up to 1 year (Tinker AFB 2004a). Because of the building size, both hazardous waste and hazardous materials destined for reutilization, transfer, donation, or sale may also be stored in Building 810. Other storage sites at Tinker AFB include the Hazardous Waste Management Facility, Building 809, east of the HWSF, and other less-than-90-day temporary storage areas. The HWSF is operated by the Defense Reutilization and Marketing Service. Tinker AFB is designated as a large quantity generator (generates 1,000 kilograms or more of HW per calendar month).

The majority of waste streams generated at Tinker AFB are from aircraft maintenance, modification, and jet engine overhaul activities. The largest waste streams result from surface preparation of aircraft skin, structural members, and engine parts. These activities include paint removal and application; grease, dirt, and carbon removal; metal etching and priming; and abrasive blasting. These processes generate toxic solvents, corrosive acids, and bases, ignitable liquids, and solutions contaminated with toxic metals. Other large waste streams result from alteration of metal surfaces through removal by grinding and cutting operations, or through build-up by electroplating and plasma-spray operations. These processes generate toxic metals, cyanide solutions, contaminated cutting and coolant fluids, and corrosive liquids.

Over 4,000 tons of hazardous waste is produced at Tinker AFB annually. To properly handle this waste, there are over 1,200 initial accumulation points and approximately 400 hazardous waste staging areas. Hazardous waste is removed from the Base and disposed by a licensed contractor.

Other HW streams generated at Tinker AFB result from RCRA corrective actions on past-contaminated sites, and remediation of a Superfund site on the Base. This waste consists of solvent, hydrocarbon, and metal-contaminated soil and debris removed during remediation projects.

3.6.6 Installation Restoration Program

The Air Force established the Installation Restoration Program (IRP) to identify, characterize, and evaluate past disposal sites and remediate contamination on its installations as needed to control migration of contaminants and potential hazards to human health and the environment in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements of 1980, and the Superfund Amendments and Reauthorization Act of 1986 as clarified in 1991 by EO 12380, Superfund Implementation.

Tinker AFB currently has recognized a total of 40 IRP sites, four of these are listed as operable units (OU) on the National Priorities List (NPL) (*i.e.*, Superfund sites). Most of the sites are regulated under RCRA. Currently 22 of the IRP sites are closed or require no further response action. Actions included soil and underground storage unit removals, landfill caps, pump and treat systems, and free-product recovery systems (Tinker AFB 2004b). Of the 18

remaining sites, only one groundwater management unit (GWMU), CG037, is within one-half mile of the existing PFC facility (Building 216) as identified in the Management Action Plan (Tinker AFB 2004b). Additional information about IRP site CG037 is provided below and on Figure 3-3, which depicts the IRP site in relation to the location of the Proposed Action.

The primary contaminant of concern in CG037 is trichloroethylene (TCE), a solvent used for cleaning equipment, trucks, and airplanes possibly as early as the 1950s. Based on the contaminant distribution and type, this GWMU appears to underlie an area possibly used for disposal of individually small amounts of TCE over a large area. Potential pathways include groundwater to water supply wells to the west and northwest. A remedy in place and response complete was issued for the site in December 2007 with long-term management in place and site closeout expected in December 2012 (Tinker AFB 2004b).

3.7 NOISE

3.7.1 Background Information

The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. Sound varies over an extremely large range of amplitudes. The decibel (dB), a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit for describing levels of sound.

Different sounds have different frequency contents. Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent adjustment, called A-weighting and expressed as A-weighted sound level measured in dBA, has been devised to measure sound similar to the way the human hearing system responds. The adjustments in amplitude, established by the American National Standards Institute (ANSI) 1983, are applied to the frequency content of the sound. Figure 3-4 depicts typical A-weighted sound pressure levels for various sources. For example, 65 dBA is equivalent to normal speech at a distance of 3 feet.

The day-night average sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10 dBA adjustment added to the nighttime levels (between 10:00 p.m. and 7:00 a.m.). This adjustment is an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by federal agencies and has been adopted by the Department of Housing and Urban Development, the Federal Aviation Administration, and the DoD. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. The Federal Interagency Committee on Urban Noise (FICON) developed land use compatibility guidelines for noise (USDOT 1980). Compatible or incompatible land use is determined by comparing the predicted DNL level at a site with the recommended land uses.

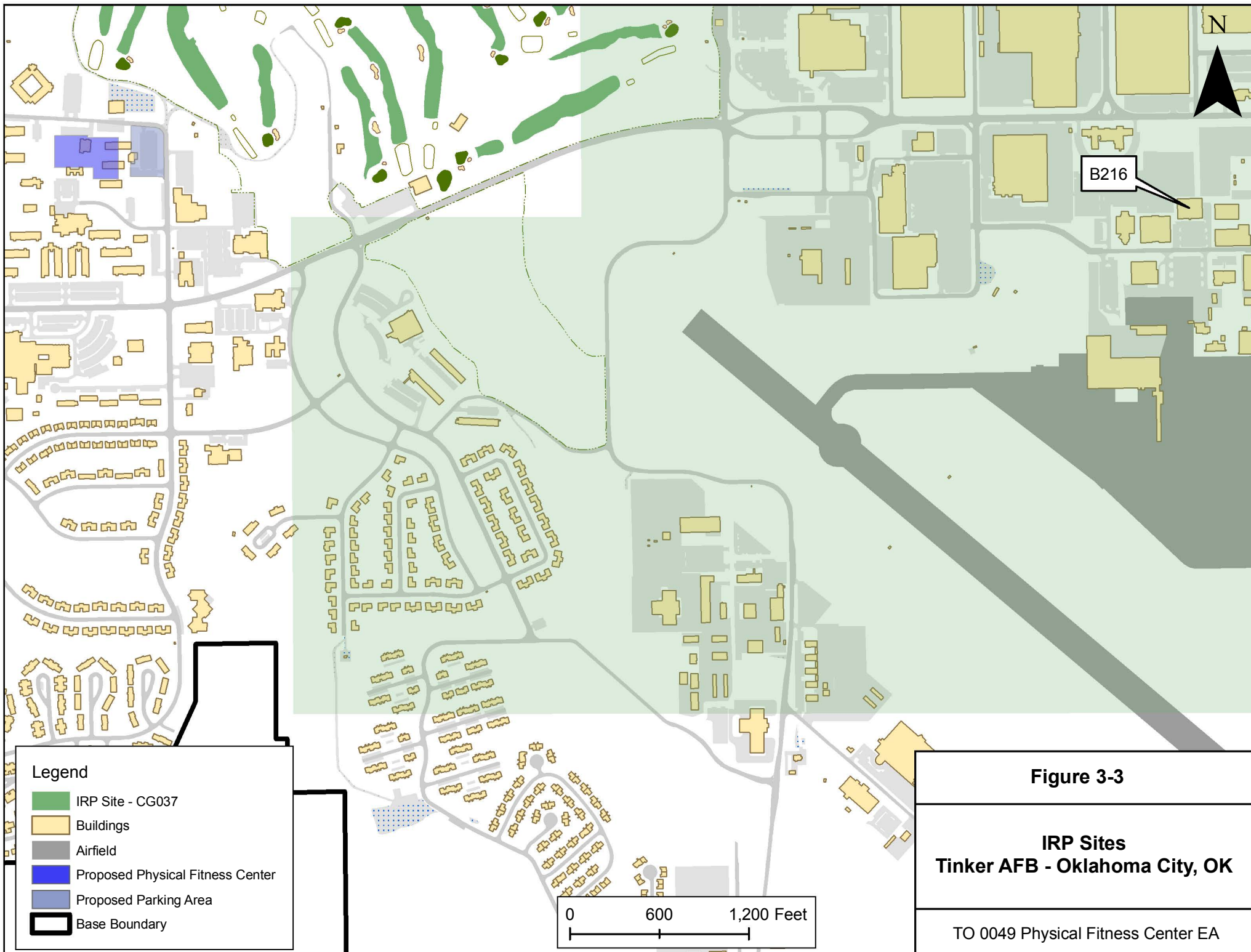


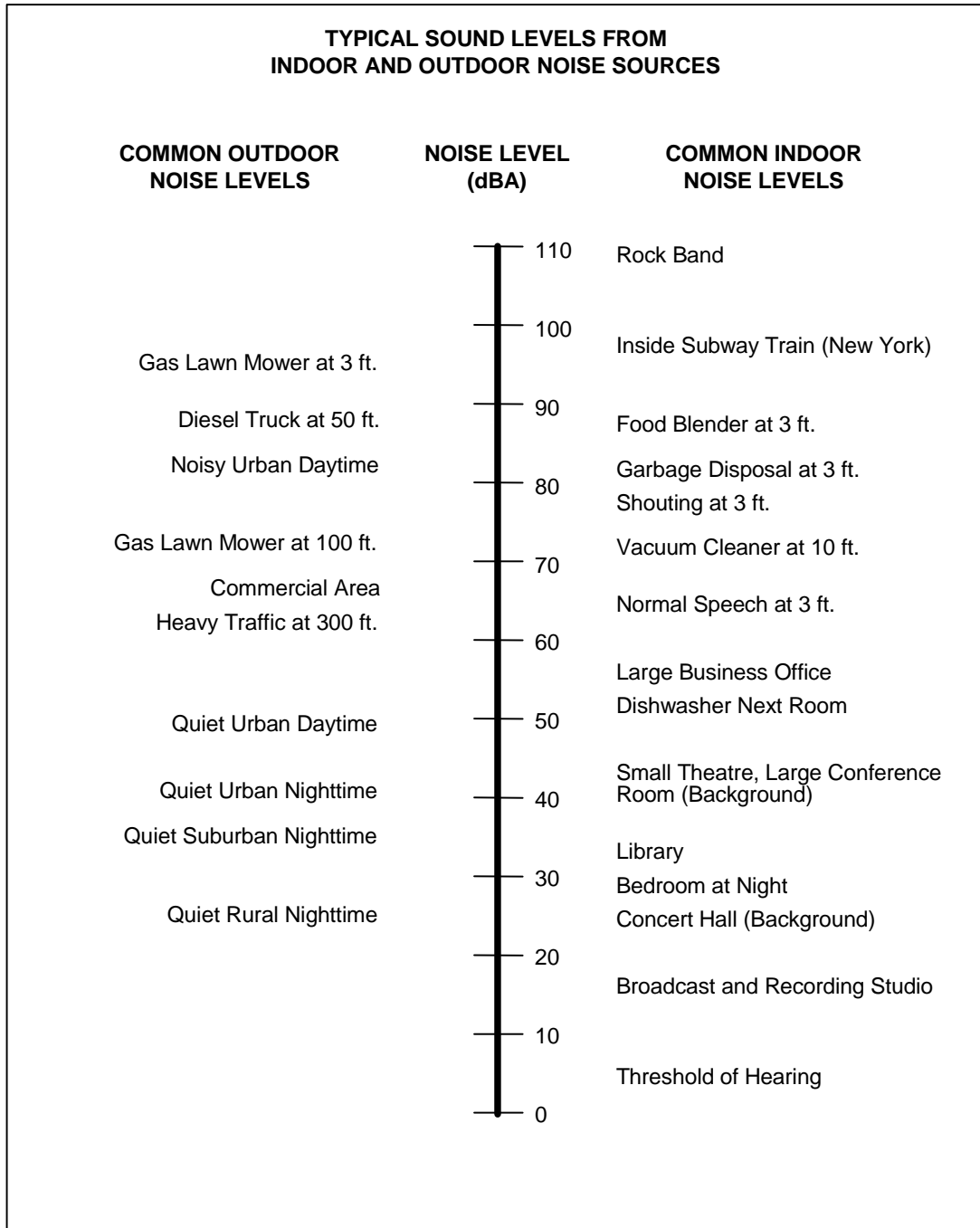
Figure 3-3

**IRP Sites
Tinker AFB - Oklahoma City, OK**

TO 0049 Physical Fitness Center EA

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Figure 3-4 Typical A-Weighted Noise Levels



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3.7.2 Existing Noise Levels

Aircraft operations are the primary source of noise at Tinker AFB. Aircraft activities include aircraft and aircraft maintenance operations. During periods of no flying activity, noise results primarily from aircraft maintenance and shop operations, ground traffic movement, occasional construction, and similar sources. This noise is almost entirely restricted to the Base itself and is comparable to sounds that occur in typical communities. It is during periods of aircraft ground or flight activity that the noise environment changes.

Noise from aircraft operations at Tinker AFB was defined using the USAF-developed NOISEMAP (Version 6.5) modeling program. This model predicted areas exposed to DNL of 65, 70, 75, 80, and 85 dBA (noise contours) for Tinker AFB. Figure 27 in the current Tinker AFB General Plan presents the aircraft noise contours from Tinker AFB aircraft flight and maintenance engine runup operations. Because only areas with a DNL above 65 dBA are considered in land use compatibility planning and impact assessment, only contours of a DNL 65 dBA and greater are shown. According to the General Plan, the project areas are not located within a DNL above 65 dBA (Tinker AFB 2005). Based on the examples in Figure 3-4, ambient noise in the project areas would range from approximately 50 dBA (quiet urban daytime) to about 70 dBA (noisy urban daytime). Further discussions about DNL and USAF land use compatibility guidelines with regards to locating noise sensitive structures and noise level reduction (NLR) measures are presented in Appendix A.

3.8 LAND USE

Existing land use on Tinker AFB consists of a wide range of uses ranging from the airfield and related operations/maintenance, to industrial, community, housing and recreational/open space uses. The central core area of the Base consists of the airfield which, with associated clear surfaces, occupies the largest portion of the Base. The airfield includes two runways and associated taxiways, aprons and aircraft parking areas in addition to the clear areas. Runway 12/30 is 10,000 feet long and Runway 17/35 is 11,100 feet long.

The Tinker AFB General Plan contains guidance for land use and development at the Base. Eleven land use categories (based on function of the activity within the category) have been established for land management at the Base: (1) administrative; (2) airfield operations and maintenance; (3) airfield (clear zones); (4) airfield pavements (runways, taxiways, apron); (5) community (commercial); (6) community (service); (7) housing (family and unaccompanied); (8) industrial; (9) medical; (10) open space; and (11) outdoor recreation (Tinker AFB 2005).

On-Base community related land uses consist of commercial and service type uses, and comprise approximately 100 acres. The majority of the commercial uses are located near Tinker Gate, and include the Base Exchange and Commissary. Other commercial land uses include the Base theater and credit union located in the northern and western portions of the Base. Community service type uses include education centers, Base library, chapel facilities, and child development centers. These uses are scattered throughout the northern and western portions of the Base, and are generally associated with commercial and administrative facilities. Other community service type uses include medical and dental clinics, and an occupational health clinic. Most of the community service related land uses are located close to family and unaccompanied housing.

The predominant land use patterns surrounding the Base are a mixture of residential and low-density commercial uses. Heavy industrial uses exist mostly to the south and east of the Base. Residential areas adjoin the Base to the west. The predominant land use for Alternatives 2 take place in areas designated alternately as: Industrial, Administrative, Community (Commercial), Airfield Operations and Maintenance, Airfield and Open Space. The predominant land use for Alternatives 3 take place in areas designated as Industrial.

Outdoor recreation and open space occupies approximately 1,300 acres on the Base. These uses include a golf course, athletic fields and courts, swimming pools, park and picnic areas, conservation and preservation areas, safety/security zones, and buffer areas. The majority of the outdoor recreational uses are located in the northwest corner of the Base, with an 18-hole golf course being the predominant use. Several small outdoor recreation uses are scattered throughout the family housing area.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

This chapter describes environmental consequences likely to occur as a result of implementing the No Action Alternative (Alternative 1) and the Proposed Action (Alternative 2). The No Action Alternative provides a baseline against which the impacts of the alternatives can be compared. Criteria and assumptions used to evaluate potential impacts are discussed at the beginning of each section.

4.1 AIR QUALITY

Air quality analyses used the following evaluation criteria to assess the impacts of the alternatives:

- Would the emissions from the action cause or contribute to a violation of any national, state, or local ambient air quality standard; and
- Would the emissions from the action represent an increase of 10 percent or more of the affected AQCR 184 emissions inventory to be considered regionally significant?

4.1.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. There would be no change from the baseline condition for air quality; therefore there would be no significant impact to air quality from the No Action Alternative.

4.1.2 Alternative 2 – Proposed Action

Under Alternative 2, the Air Force proposes to construct a new PFC and HAWC near the northwest corner of 34th Street and McNarney Avenue. The existing facilities located in Buildings 216 and 6004 would be demolished along with the swimming pool located adjacent to Building 6004 (see Figure 1-3). Additionally, the existing HAWC located in Building 5922 and six other buildings (5915, 5916, 5920, 5924, 5927, and 5937) would be demolished.

Fugitive dust from ground disturbing activities and combustive emissions from construction equipment would be generated during demolition and construction activities. Fugitive dust would be generated from activities associated with site clearing, grading, cut and fill operations, and from vehicular traffic moving over the disturbed site. These emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. The USEPA has estimated that uncontrolled fugitive dust emissions from ground-disturbing activities would be emitted at a rate of 80 lbs of TSP per acre per day of disturbance (USEPA 1995). In a USEPA study of air sampling data at a distance of 50 meters downwind from construction activities, PM₁₀ emissions from various open dust sources were determined based on the ratio of PM₁₀ to TSP sampling data. The average PM₁₀ to TSP ratios for top soil

removal, aggregate hauling, and cut and fill operations are reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for PM₁₀ dust emissions becomes 19.2 lbs per acre per day of disturbance.

The USEPA also assumes that 230 working days are available per year for construction (accounting for weekends, weather, and holidays), and that only half of these working days would result in uncontrolled fugitive dust emissions at the emitted rate described above (USEPA 1995). The construction emissions presented in Table 4.1 include the estimated annual PM₁₀ and PM_{2.5} emissions associated with the Proposed Action at Tinker AFB. These emissions would produce slightly elevated short-term PM₁₀ and PM_{2.5} ambient air concentrations. The USEPA estimates that impacts of fugitive dust from construction activities would be reduced significantly with an effective watering program. Watering the disturbed area of the construction with approximately 3,500 gallons per acre per day would reduce TSP emissions as much as 50 percent (USEPA 1995).

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established cost estimating methods for construction and experience with similar types of construction projects (Means 2008). Combustive emissions from construction equipment exhausts were estimated by using USEPA-approved emissions factors for heavy-duty diesel powered construction equipment (USEPA 1985). The construction emissions presented in Table 4.1 include the estimated annual emissions from construction equipment exhaust associated with Alternative 2 at Tinker AFB. As a conservative estimate, it is assumed that demolition and construction activities would last about 12 months and that ground-disturbing activities would occur during the entire project duration, with continuous cut and fill operations.

Table 4.1 Alternative 2 Emissions

Criteria Air Pollutants	CO (TPY)	VOC (TPY)	NO _x (TPY)	SO _x (TPY)	PM ₁₀ (TPY)	PM _{2.5} (TPY)
AQCR CY 2005 Totals ^a	496,088	87,251	82,366	3,781	121,823	17,789
Alternative 2 Annual Emissions ^b	6.75	1.32	15.94	1.72	8.14	1.19
Project Emissions as Percent of AQCR Emissions	0.001	0.002	0.019	0.046	0.007	0.007

^a AIRData 2009.

^b Estimated CY 2015 annual emissions from Alternative 2 activities. It is anticipated construction activities would be for a duration of 12 months.

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an ozone precursor, it is a controlled pollutant.

The total estimated project emissions were calculated to get the anticipated annual emissions. Analysis is based on a one-year period to align with baseline emissions data, which are for one year. As with fugitive dust emissions, combustion emissions would produce slightly elevated air pollutant concentrations. However, the impacts would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-

term impacts. Table 4.1 lists the annual emissions from on-Base construction activities and the annual percent of change when compared to the baseline for Alternative 2.

Review of data in Table 4.1 for AQCR 184 indicates that all increases in emission criteria from the demolition and construction activities associated with Alternative 2 would be NO_x (0.019% and 15.94 tpy) and SO_x (0.046% and 1.72 tpy). Emissions fall below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852. However, the area is in attainment. Based on the above analysis, air emission impacts from the construction activities associated with the Alternative 2 would not be considered significant. The general conformity rule described in subchapter 3.1.1 would also not apply because the AQCR is in attainment status. Additionally, no SIP would be required. Therefore, there would be no significant impacts to air quality from the Proposed Action.

4.1.3 Mitigation

No air quality impacts would be anticipated from the Proposed Action; therefore, no mitigation would be required.

4.1.4 Cumulative Impacts

The Air Force proposes to conduct 18 other construction projects during the same period as the proposed demolition and construction of the PFC and HAWC at Tinker AFB. As discussed in subchapter 2.6, Table 2.2 summarizes the estimated buildings and other structures to be constructed and demolished for cumulative conditions. For analysis purposes, the emissions from these projects were combined with the Proposed Action emissions to represent the most conservative condition that would occur in any one year for cumulative condition impacts. The method used to calculate the emissions for the Proposed Action was used for the cumulative conditions. Table 4.2 lists the annual emissions and the annual percent of change when compared to the baseline for the Proposed Action cumulative condition.

Table 4.2 Alternative 2 and Other Actions Emissions

CRITERIA AIR POLLUTANT	CO (TPY)	VOC (TPY)	NOX (TPY)	SOX (TPY)	PM10 (TPY)	PM2.5 (TPY)
AQCR CY 2005 Totals ^a	496,088	87,251	82,366	3,781	121,823	17,789
Annual Emissions:						
Proposed Action	6.75	1.32	15.94	1.72	8.14	1.19
Other Actions	11.57	2.38	28.57	3.09	12.93	1.89
Total Annual Emissions ^b	18.32	3.70	44.51	4.81	21.07	3.08
Project Emissions as Percent of AQCR Emissions	0.004	0.004	0.054	0.127	0.017	0.017

^a AIRData 2009.

^b Estimated annual emissions from Proposed Action and other construction activities. It is anticipated construction activities would begin in 2015 for a total duration of 2 yrs

Note: VOC is not a criteria air pollutant. However, VOC is reported because, as an ozone precursor, it is a controlled pollutant. PM_{2.5} included for information only.

Review of the data in Tables 4.2 indicates that the greatest increase in emissions from demolition and construction activities for the cumulative condition would be NO_x (0.054% and 44.51 tpy) and SO_x (0.127% and 4.81 tpy) under the Alternative 2 cumulative condition. The PM₁₀ emissions equate to 0.017 percent of the PM₁₀ emissions within the AQCR. The emissions for the cumulative condition would be temporary and would be eliminated after

completion of the activities. Emissions for the cumulative condition fall below the 10 percent level that would be considered regionally significant by the USEPA if the region were nonattainment for any of the criteria pollutants as stated in 40 CFR 51, Subpart W, Section 852. However, the area is in attainment. Therefore, the air emissions from the construction activities associated with the Proposed Action and cumulative conditions would not be considered significant.

4.2 INFRASTRUCTURE AND UTILITIES

The criteria used to evaluate impact on utility systems were:

- The degree to which the change in demands from implementation of the alternative actions would cause increased demands on energy, solid waste, and transportation management; and
- Storm water runoff due to substantial increases in impervious cover;

4.2.1 Alternative 1 - No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. However, maintaining the status quo does not meet the purpose and need for the action, as outlined in subchapter 1.3.

Energy

Under the No-Action Alternative, there would be no change to the baseline condition, as described in Section 3.2.1.

Storm Water Management

Under the No-Action Alternative, there would be no change to the baseline condition, as described in Section 3.2.2.

Solid Waste Management

Under the No-Action Alternative, there would be no change to the baseline condition, as described in Section 3.2.3.

Transportation

Under the No-Action Alternative, there would be no change to the baseline condition, as described in Section 3.2.4.

4.2.2 Alternative 2 – Proposed Action

Energy

Implementation of the Proposed Action would result in a decrease in the demand for energy upon completion and operation of the new PFC and HAWC. The total amount of buildings to be demolished is 135,309 ft² and the amount to be constructed is 102,632 ft². Therefore, more building space would be demolished than would be constructed. A net

decrease of 32,677 ft² would result from the Proposed Action (135,309 – 102,632 = 32,677) thereby decreasing energy consumption (see Table 2.1 and subchapter 2.4.2 for details).

Electricity use would decrease by 0.18 MBtu per day (0.00000556 MBtu per day per ft² x 32,677 ft² = 0.18 MBtu per day), which is about a 0.22 percent decrease below the baseline condition and about 0.006 percent of system capacity. Natural gas use would decrease by 0.28 MBtu per day (0.00000869 MBtu per day x 32,677 ft² = 0.28 MBtu per day), which is about 0.05 percent of system capacity.

Most of the buildings proposed for demolition are old and energy inefficient, whereas the new PFC facility would be of modern design and incorporate optimum energy efficient equipment that would substantially reduce the annual energy consumption. For these reasons, no significant energy impacts would be expected on energy consumption.

Storm Water Management

The Proposed Action would not affect any surface water bodies nor is it located in the 100-year floodplain. The Proposed Action would result in an increase in impervious cover of 0.79 acres (see subchapter 2.4.2.2 for details), which represents an increase of 0.04 percent above baseline conditions. Storm water discharges for construction projects with areas greater than 1 acre are regulated by 40 CFR 9, 122, 123 and 124. The contractor would be required to prepare a SWPPP to mitigate any possible erosion caused by storm water and protection of wetlands. The plan would be coordinated with 72 ABW/CEVOE personnel to ensure its implementation. Appropriate BMPs for erosion-control measures would be taken during construction to avoid water quality impacts from rainfall runoff.

Solid Waste Management

Under Alternative 2, the Air Force proposes to construct a new PFC and HAWC near the northwest corner of 34th Street and McNarney Avenue. The existing facilities located in Buildings 216 and 6004 would be demolished along with the swimming pool located adjacent to Building 6004 (see Figure 1-3). The existing HAWC located in Building 5922 and six other buildings (5915, 5916, 5920, 5924, 5927, and 5937) would also be demolished. Additionally, the concrete parking lot at the corner of 34th Street and McNarney Avenue has deteriorated over the years and would be demolished and replaced with a larger parking area constructed at the same location. Table 2.1 details the number of buildings and other structures that would be demolished under this alternative as well as the year constructed and amount of disturbed area.

Analysis of the impacts associated with the proposed demolition and construction activities is based on the following assumptions:

- Approximately 3.89 pounds of construction debris is generated for each square foot of floor area for new structures (Franklin Associates 1998);
- Approximately 155 pounds of demolition debris is generated for each square foot of floor area of demolished structures (Franklin Associates 1998);
- The Southeast Landfill is permitted for its projected remaining life of 18 years from the beginning of the construction period (2027-2009) and the average deposition rate for construction and demolition debris in the landfill is 2,067 tons per day, 260 days per year; and

- Debris would be disposed 5 days per week (260 days per year) over the construction period.

Type IV solid waste would be generated from implementation of the Proposed Action. This waste would consist of building debris and construction materials such as concrete, metals (roofing, reinforcement bars, conduit, piping, *etc.*), fiberglass (roofing materials and insulation), cardboard, plastics (PVC piping, packaging material, shrink wrap, *etc.*), and lumber. Based on information in subchapter 2.4.2 and estimates, 184,509 ft² of structures would be demolished and 176,432 ft² of new building and parking area would be constructed on-Base. Based on these data and the assumptions listed above, it is estimated that 14,643 tons of demolition and construction debris would be generated by the Proposed Action.

It is assumed the debris would be disposed in the Southeast Landfill. Disposal of demolition and construction debris from the Proposed Action would increase the disposal rate at the Southeast Landfill by approximately 56.3 tons per day over the 12-month construction period. This rate is conservative and reflects that all waste would be disposed in the landfill. It is assumed the contractor would recycle materials to the maximum extent possible, thereby reducing the amount of construction and demolition debris disposed in the landfill. However, the exact amount of debris cannot be estimated at this time and this analysis assessed the most conservative condition.

As mentioned in paragraph 3.2.2, the landfill has a projected life expectancy of 18 years, with an average disposal rate of 2,067 tons per day. Based on an average disposal of 260 days per year (*i.e.*, 5 days per week) for 18 years (4,680 days), the total remaining capacity of the landfill is estimated at 9,673,560 tons ($260 \times 18 \times 2067 = 9,673,560$). The projected disposal from the project (14,643 tons) equates to about 0.15 percent of the total remaining capacity. The 18-year life expectancy of the landfill would be expected to decrease by approximately 3.1 days (0.15% of 4,680 days). The average daily disposal rate would increase at the Southeast Landfill by approximately 56.3 tons per day over the 12-month period. Disposal of construction and demolition debris from the Proposed Action would not significantly reduce the life expectancy of the landfill. Therefore, impacts from the implementation of the Proposed Action would not be considered significant.

Transportation

In considering the basis for evaluating the significance of impacts on transportation systems, several items were examined, including:

- The degree to which a transportation system would have to alter operating practices and personnel requirements to support the action;
- The capacity required from new or revised transportation systems; and
- The degree to which the increased demands from the proposed program would reduce the reliability of transportation systems or aggravate already existing adverse conditions on Base.

Under the Proposed Action, PFC and HAWC demolition and construction activities would not alter existing transportation systems on Base. There would be no increase in assigned personnel at the Base as a result of the proposed project; therefore, there would be no increase in overall traffic. Since Building 216 would be demolished and not replaced, there would

actually be a decrease in traffic on Sentry Road between Avenues D and F. Traffic near the new PFC and HAWC facilities would increase slightly since military and civilian personnel who previously used the facilities in Building 216 would now have to drive to the new facility located at 34th Street and McNarney Avenue. The commute to the new PFC facility for military personnel living in the dormitories and MFH areas would be half as much as it was when traveling to Building 216.

On-Base traffic patterns would not change from existing conditions. Due to the location of the Proposed Action, no major traffic delays would be anticipated; however, some minor traffic delays are anticipated during construction of the new PFC and the HAWC. Those traffic delays would cease once construction is complete. Therefore, implementation of the Alternative 2 would not be expected to impact transportation infrastructure.

4.2.3 Mitigation

The Proposed Action would not increase demands on the existing energy, solid waste management, or transportation systems, and would not exceed the capacities of existing systems. Therefore, no mitigation would be required.

4.2.4 Cumulative Impacts

Energy

Twelve buildings and two parking areas would be demolished and four dormitories would be constructed under the other actions (see Table 2.2). Approximately 240,000 ft² of new building space would be constructed for other action projects (four L-shaped dormitories 3-stories high) and approximately 241,800 ft² of building space would be demolished for a net reduction of 1,800 ft² building space. Under the Proposed Action cumulative condition, there would be a net reduction of 34,477 ft² of building space ($1,800 + 32,677 = 34,477$). This represents an electrical energy savings of 0.19 MBtu per day ($0.00000556 \text{ MBtu per day per ft}^2 \times 34,477 \text{ ft}^2 = 0.19 \text{ MBtu per day}$) and a natural gas energy savings of 0.3 MBtu per day ($0.00000869 \text{ MBtu per day per ft}^2 \times 34,477 \text{ ft}^2 = 0.3 \text{ MBtu per day}$). Therefore, the Base would save approximately 0.49 MBtu per day of energy from implementation of the Proposed Action cumulative condition.

The new PFC and HAWC would be climate controlled and more energy efficient than the facilities being replaced. As stated in paragraph 3.2.1, the distribution systems have more than adequate capacity. Therefore, no significant cumulative energy impacts would be anticipated from the Proposed Action and the other projects.

Storm Water Management

The Proposed Action cumulative condition would not affect any surface water bodies nor would it be located in the 100-year floodplain. The Proposed Action cumulative condition would result in a decrease in impervious cover of 0.73 acres (see subchapter 2.3.2.2 for details), which represents an increase of 0.04 percent above baseline conditions. Storm water discharges for construction projects with areas greater than 1 acre are regulated by 40 CFR 9, 122, 123 and 124. The contractor would be required to prepare a SWPPP to mitigate any possible erosion caused by storm water and protection of wetlands. The plan would be coordinated with 72 ABW/CEVOE personnel to ensure its implementation. Appropriate BMPs

for erosion-control measures would be taken during construction to avoid water quality impacts from rainfall runoff.

Solid Waste Management

Based on the information in Subsection 2.6 and Table 2.2, a total of about 240,000 ft² of building space would be constructed under other actions, and 317,800 ft² would be demolished. Additionally, 20,825 ft² of parking area (north of Buildings 5920 and 5922) would be demolished. Based on these data and the assumptions listed in paragraph 4.2.2 (Solid Waste Management), it is estimated that 20,820 tons of debris would be generated by the other actions. The total amount of solid waste generated from the Proposed Action and other action projects would be 35,463 tons (14,643 + 20,820 = 35,463). Disposal of demolition and construction debris from the Proposed Action and other actions would increase the disposal rate at the Southeast Landfill by an average 136.4 tons per day over the 12 month period (260 days per year).

Using the remaining capacity, remaining days of disposal, and average daily disposal information stated in Subsection 4.2.2 (Solid Waste Management), projected disposal from the Proposed Action and other actions (35,463 tons, or 136.4 tons per day) equates to about 0.37 percent of the total remaining capacity of the landfill. The 18-year life expectancy of the landfill would be expected to decrease by 17.3 days (0.37% of 4,680 days). Disposal of construction and demolition debris from the Proposed Action and other actions would not significantly reduce the life expectancy of the landfill. Therefore, cumulative impacts from implementation of the Proposed Action and other actions would not be considered significant.

Transportation

Although demolition and construction activities associated with the other actions would occur simultaneously, the other actions and the Proposed Action would all occur in the northwest area of the Base (between Arnold Avenue, McNarney Avenue, and 34th Street). The proximity between the other actions project sites and the Proposed Action sites would need to be carefully coordinated by the contractors performing the construction activities to minimize the potential for combining the traffic from all activities. No significant transportation impacts would be anticipated for the cumulative condition.

4.3 BIOLOGICAL RESOURCES

Biological resources analyses used the following evaluation criteria to assess the impacts of the alternatives:

- Diminished habitat for a plant or animal species;
- Diminished regionally important plant or animal species; and
- Interference with wildlife movement or reproductive behavior.

4.3.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. However, maintaining the status quo does not meet the purpose and need for the action, as

outlined in subchapter 1.3. Plant and animal species resources, including threatened or endangered species would not change from baseline conditions.

4.3.2 Alternative 2 – Proposed Action

Under Alternative 2, a new PFC would be constructed near the northwest corner of 34th Street and McNarney Avenue in FY 2015 and a new HAWC would be located within the new facility (see Figure 1-2). The existing facilities located in Buildings 216 and 6004 would be demolished along with the swimming pool located adjacent to Building 6004 (see Figure 1-3). Additionally, the existing HAWC located in Building 5922 and six other buildings (5915, 5916, 5920, 5924, 5927, and 5937) would be demolished. The site of the Proposed Action is located in previously disturbed areas with minimal habitat or native plant species. Therefore, Alternative 2 would not substantially change habitat for plant or animal species, nor would it diminish an important plant or animal species.

4.3.3 Mitigation

No adverse impacts to plants or animal species were identified for the alternative actions. Therefore, no mitigation would be necessary.

4.3.4 Cumulative Impacts

The Air Force proposes 18 additional construction projects during the timeframe of the Proposed Action. Due to the location and the site being previously disturbed, it is unlikely that the Proposed Action would contribute to cumulative impacts to biological resources.

4.4 WATER RESOURCES

Water resources analyses used the following evaluation criteria to assess the impacts of the alternatives:

- Change in water quality of surface water.
- Change in water quality of groundwater resources;
- Disturbance to wetlands areas; and
- Interference with current 100-year floodplain causing changes to the baseline delineated floodplain.

4.4.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. However, maintaining the status quo does not meet the purpose and need for the action, as outlined in subchapter 1.3. Water resource conditions would not change from baseline conditions.

4.4.2 Alternative 2 – Proposed Action

Surface Water

The Proposed Action consists of demolition, shallow excavation, paving, and construction activities. There would be a total net increase in impervious cover of about 0.80 acres. The potential for increased sediment loading of surface water during the initial demolition and

construction of the buildings is the most likely impact associated with the proposed project. The closest intermittent stream to the new PFC and HAWC facilities is approximately 370 feet west of the construction area. This stream runs north to a pond on the Base golf course at the extreme northwest portion of Tinker AFB. The potential sediment loading is short-term and is manageable through implementation of the SWPPP. No new construction would occur in the 100-year floodplain.

The construction contractor would adhere to the Base's SWPPP along with the incorporation of BMPs before initiating activities. The plan likely would include the following erosion control techniques that would be used during demolition and construction to minimize erosion. The construction sites would have silt fences and other erosion control features such as absorbent booms for oils and greases down gradient. Hay bales or other absorbent materials would be installed around storm drainage system inlets to prevent sediment or other contaminants from entering the storm water system during the project. The rate of runoff from the construction site would be retarded and controlled mechanically. Diversion ditches would be constructed to retard and divert runoff to protected drainage courses. Storm water runoff would be minimized to prevent off-site transport of sediments into neighboring streams and ponds using natural vegetation (existing trees, brushes, and grasses) as much as possible to provide additional water quality benefits. Therefore, no significant storm water management impacts would be anticipated from project site runoff.

Wetlands

Discharging dredge or fill material into wetlands and waters of the United States on Tinker AFB is regulated by the USACE under Section 404 of the Clean Water Act. Disturbance of wetlands by federal activities is further regulated by EO 11990 for the preservation of wetlands. Due to minimal soil disturbance activities associated with the construction of the PFC, no impacts to wetland areas would be expected.

No demolition, construction, or renovation activities associated with the Proposed Action would occur within a wetland. However, wetlands occur within about 1,100 feet of the new PFC and HAWC construction areas. The construction contractor would adhere to the Base's SWPPP before initiating any demolition and construction activities. The plan likely would contain practices such as installation of a silt fence between the wetlands and the project area that would allow space between the fence and the housing area for equipment operation, as well as to serve as a buffer to ensure separation of activities from the wetlands. Surface or storm drainage runoff would be reduced to a non-erosive velocity. Surface and storm drainage runoff containing herbicides, fertilizers, and petroleum based contaminants would be minimized by using vegetated buffers and other pollution prevention activities during and after development and construction activities are complete. These activities would prevent impact to the wetlands. No significant adverse impacts would be anticipated to wetlands.

Floodplains

Under the Proposed Action, construction and demolition activities would not occur in a floodplain. Therefore, no impacts to floodplains would be expected.

4.4.3 Mitigation

No adverse impacts to water resources were identified for the alternative actions. Therefore, no mitigation would be necessary.

4.4.4 Cumulative Impacts

The Proposed Action and other projects require the use of BMPs to control runoff during construction activities. With BMPs and a SWPPP in place, the Proposed Action is not anticipated to result in changes or adverse effects to water resources. Cumulative impacts from the Proposed Action are not anticipated.

4.5 EARTH RESOURCES

Impacts to earth resources are considered based on the following evaluation criteria:

- The potential to increase erosion caused by the disturbance of the ground surface during the construction and demolition of facilities; or
- Changes to topography with slopes over 20 percent.

4.5.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. There would be no change from the baseline condition for earth resources.

4.5.2 Alternative 2 – Proposed Action

The site of the proposed construction and demolition activities for Alternative 2 is relatively flat and previously developed; therefore, changes in topography are not expected. Geology would not change and soil disturbances would be minimal and of short-duration. However, it is anticipated the contractor would minimize disturbance of the topography and soil to retain as much of the natural setting as possible. The contractor would ensure a storm water pollution prevention plan is completed and approved before initiating activities. The plan would include BMPs for erosion control techniques.

Earthwork would be planned and conducted in such a manner as to minimize the duration of exposure of unprotected soil. Unprotected soil is defined as exposed soil, fill material, or excavation material not stabilized by vegetation or other materials. Side slopes and back slopes would be protected immediately upon completion of rough grading. Protection would be provided by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Slopes too steep for stabilization by other means would be stabilized by hydroseeding, mulch anchored in place, covering by anchored netting, sodding, or such combination of these and other methods as may be necessary for effective erosion control. Use of BMPs such as rock berms, silt fences, and single point construction entries would minimize erosion during construction. Grass and other landscaping would be reestablished using natural vegetation in the disturbed areas immediately after completion of construction, thereby reducing the potential for erosion. For these reasons, no impacts to earth resources would be expected from Alternative 2.

4.5.3 Mitigation

No changes in topography or disturbances of the ground surface are anticipated from the alternative actions. Therefore, no mitigation would be necessary.

4.5.4 Cumulative Impacts

As with the Proposed Action, the other projects would occur within an area where the soil has been disturbed and modified by previous activity. Potential cumulative effects would include an increase in soil disturbances associated with construction activities. These impacts would be reduced by the use of BMPs to minimize soil erosion and reduce fugitive dust emissions. No significant cumulative impacts to soil would be anticipated from the Proposed Action and the other projects.

4.6 HAZARDOUS MATERIALS AND WASTE

Impacts to HMs and HW management are considered based on the following evaluation criteria:

- The federal action would result in noncompliance with existing Tinker AFB environmental management practices, as well as applicable federal and ODEQ regulations;
- The action would cause waste generation that could not be accommodated by current Tinker AFB waste management capacities; or
- The action would interfere with the IRP.

4.6.1 Alternative 1 - No Action Alternative

Under the No-Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. There would be no change in the baseline conditions for HMs and HW management and the IRP. HMs and HW management would continue to be managed by the Base's Hazardous Waste Management Program.

4.6.2 Alternative 2 – Proposed Action

Hazardous Materials

During implementation of Alternative 2, products containing HMs may be procured and used by the contractor during construction and demolition activities (*i.e.*, fuels, hydraulic fluid, motor oil for vehicle maintenance and adhesives and sealants for construction activities). The HMs management program applies to all Base activities, including contractors, and operating locations. HMs would not be used by the contractor until they are entered into the Hazardous Materials Management System, approved for use, and issued a serial tracking label. Under this system, Environmental Compliance Operations Branch personnel maintain positive records for the location of the containers, from issue to return, and ultimate disposal of hazardous materials. No HMs would be used that could not be accommodated by current Tinker AFB waste management capacities.

Fueling and lubrication of equipment would be conducted in a manner that affords maximum protection against spills. In the event of a spill of any amount or type of HM

(petroleum products included), the contractor would take immediate action to contain and clean up the spill. Contractor spill clean up personnel would be trained and certified to perform spill clean up. All waste and associated clean up material would be removed from the project site and transported and/or stored in accordance with regulations until final disposal. There are three aquifer systems in the area of Tinker AFB and each system is isolated from the others by clayey sequences. The isolation of groundwater systems would preclude downward migration of any HM should a spill occur during construction activities.

Asbestos Containing Materials

ACM is potentially present in pipe insulation, cement pipe, floor tile, floor tile adhesive, roof patching sealant, wall board in mechanical closets, wall and ceiling texture, and wall board panels of all buildings located on Tinker AFB. ACM is also potentially present in thermal insulation of elbow gasket material and boiler rope gasket material, transite panels, mastic under floor tile, and linoleum. The guidelines present in the Tinker AFB Asbestos Management and Operation Plan must be followed to abate all ACM from the affected units prior to demolition activities. Given the potential, the negative impacts to the environment resulting from this Proposed Action resulting from this alternative would be short-term and would be minimized as long as the guidelines outlined in the Tinker AFB Asbestos Management and Operation Plan were followed during demolition activities associated with the Proposed Action. ACM would not be used in the construction of any new facilities.

Lead-based Paint

LBP must be considered to be potentially present in all facilities constructed prior to 1980 at Tinker AFB. Some of the facilities identified in Table 2.1 were constructed before LBP was discontinued. LBP may be present within the soil surrounding the facilities. Of particular concern would be earthmoving activities such as grading or leveling. Procedures stated in the Tinker AFB LBP Management Plan must be followed to properly test and manage facilities that have been found to house LBP. Note that areas where LBP has been abated or not found should still be regarded as possibly containing LBP. LBP may be present within the soil surrounding the facilities. If it is necessary to remove soil for off-site disposal, a limited number of random samples would be collected to assess the presence or absence of lead in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations for disposal off-site.

Pesticides

Currently Tinker AFB management applies commercially available pesticides. Tinker AFB records indicate the historical application of several pesticides that are no longer approved for use. Although these pesticides were used in accordance with manufacturers' guidance and directions, the potential exists for residual concentrations in the soil underlying on-Base facilities. If it is necessary to remove soil for off-site disposal, a limited number of random samples would be collected to assess the presence or absence of pesticides in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations for disposal off-site.

Hazardous Waste

The construction contractor would maintain records of all waste determinations, including appropriate results of analysis performed, substances and sample locations, date and time of collection, and other pertinent data as required by 40 CFR Part 280, Section 74 and 40 CFR, Part 262, Subpart D. Any HW generated would be handled in accordance with all federal, state, and local laws and regulations, including RCRA requirements for waste management and USDOT requirements for waste transport.

In the event of a spill of any amount or type of HM or HW (petroleum products included), the contractor would take immediate action to contain and clean up the spill. Contractor spill clean up personnel would be trained and certified to perform spill clean up. All waste and associated clean up material would be removed from the project site and transported and/or stored in accordance with regulations until final disposal.

Installation Restoration Program

As discussed in subchapter 3.6.6, Building 216 is located within IRP site CG037. Based on widespread soil sampling done at Tinker AFB and because there is no known history of disposal at this facility, it is highly unlikely that any solvent type contaminants would remain in the shallow surface (including up to a 3-foot depth for the foundations) due to volatilization of the organics. Groundwater contaminant levels are expected to decrease over time. Therefore, it is unlikely that contaminants would be encountered during demolition of the existing PFC facility become a problem during operation of the alternative action. No impacts would be anticipated.

It is estimated that subsurface disturbance from construction and demolition activities, including utilities improvements, would occur at depths no greater than 10 feet below the ground surface. Groundwater contamination at Tinker AFB occurs at depths ranging from 10 to 20 feet below the ground surface. Based on the distance between the depths at which the proposed construction activities would occur and groundwater contamination, it is unlikely there would be any interaction between the construction activities and groundwater contamination from CG037. For these reasons, the Proposed Action would not interfere with the ongoing remediation efforts and no significant IRP impacts would be anticipated.

4.6.3 Mitigation

The alternative actions would not cause noncompliance with environmental quality regulations or generate waste that could not be accommodated by current Tinker AFB hazardous materials and waste management capacities. No impacts would be anticipated. Therefore, no mitigation would be required.

4.6.4 Cumulative Impacts

The Proposed Action and other action projects would require the management of ACM, LBP, and movement of associated hazardous materials and waste. Management of these materials and waste streams would occur under the existing Tinker AFB management programs and would not result in adverse effects. The potential for the presence and management of pesticide impacted soil beneath existing facilities would also not result in adverse effects. Therefore, the Proposed Action would not contribute to cumulative effects to hazardous materials and waste in or around Tinker AFB.

Additionally, the sites of the other action projects are not located over IRP Site CG037; therefore, no significant cumulative IRP impacts would be anticipated from the Proposed and the other projects.

4.7 NOISE

The following evaluation criteria were used to determine the impacts of noise:

- The degree to which noise levels generated by mission operations, as well as demolition, construction, and renovation activities are greater than the ambient noise levels;
- The degree to which there would be annoyance, speech and instructional interference, and loss of sleep; and
- The proximity of noise-sensitive receptors such as residences, medical facilities, and schools to the noise source.

4.7.1 Alternative 1 – No Action Alternative

Under the No-Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. However, maintaining the status quo does not meet the purpose and need for the action, as outlined in subchapter 1.3. There would be no change in the baseline conditions described in Section 3.7.

4.7.2 Alternative 2 – Proposed Action

Assuming that noise from the construction and demolition equipment radiates equally in all directions, the sound intensity would diminish inversely at the square of the distance from the source. Therefore, in a free field (no reflections of sound), the sound pressure level decreases 6 dB with each doubling of the distance from the source. Under most conditions, reflected sound will reduce the attenuation due to distance. Therefore, doubling the distance may only result in a decrease of 4 to 5 dB (AIHA 1996). Table 4.3 shows the anticipated sound pressure levels at a distance of 50 feet for miscellaneous heavy equipment.

Demolition, construction, and renovation of housing units would be accomplished under the Proposed Action. The primary source of noise from these activities would be from equipment and vehicles involved in demolition, site preparation, foundation preparation, construction, and finishing work. Typical noise levels generated by these activities range from 75 to 89 dB at 50 feet from the source. Sensitive receptors in the vicinity of these short-term activities could include dormitory units near the project site and the Medical Clinic, which is located south of the new PFC area.

Table 4.3 Heavy Equipment Noise Levels at 50 Feet

Equipment Type	Number Used ¹	Generated Noise Levels, L_p (Db) ²
Bulldozer	1	88
Backhoe (rubber tire)	1	80
Front Loader (rubber tire)	1	80
Concrete Truck	1	75
Concrete Finisher	1	80
Crane	1	75
Asphalt Spreader	1	80
Roller	1	80
Flat Bed Truck (18 wheel)	1	75
Scraper	1	89
Trenching Machine	1	85

Estimated number in use at any time.

L_p = sound pressure level

Source: CERL, 1978.

For the purposes of this analysis, it is estimated the shortest distance between a demolition, construction, or renovation noise source and a sensitive receptor would be about 100 feet. Conservatively, outdoor noise at an occupied residence or school could range from as high as 71 to 85 dB at 100 feet from the source. However, the noise level could be lower if the sound is not reflected. Interior noise levels would be reduced from the 71 to 85 dB level by approximately 18 to 27 due to the NLR properties of the building's construction materials (USDOT 1992). It is anticipated that demolition and construction activities would occur between 7:30 a.m. and 4:30 p.m., 5 days per week for the duration of the project. The noise would be temporary and occur only during the hours that construction, demolition, or renovation activity would occur and would cease when the project is completed.

Based on data in Table 4.4, 61 percent of the persons exposed to DNL greater than 80 dBA could be highly annoyed from the construction, demolition, or renovation noise. No hearing loss would be anticipated for persons outdoors because they would not be exposed to DNL equal to or greater than 75 dBA for 40 years of exposure at 16 hours per day, the level at which hearing loss could occur. Sleep interference is unlikely because demolition, construction, and renovation activities would occur during the daytime.

Table 4.4 Percentage of Persons Highly Annoyed by Noise Exposure

Noise Exposure Zone (DNL DBA)	Percentage of Persons Highly Annoyed
<65	<15
65-70	15-25
70-75	25-37
75-80	37-52
>80	61

Note: Noise impacts on individuals vary. The “low” numbers above indicate individuals with higher tolerance of noise while the “high” numbers indicate individuals with higher sensitivity to noise.

Source: Adapted from NAS 1977.

Elevated noise levels can interfere with speech, causing annoyance or communication difficulties. Based on a variety of studies, DNL 75 dBA indicates there is good probability for frequent speech disruption. This level produces ratings of “barely acceptable” for intelligibility of spoken material. Persons conducting conversations within the project area could have their speech disrupted by construction, demolition, or renovation-generated noise. Speech disruption would be temporary, lasting only as long as the noise-producing event.

The primary source of noise at Tinker AFB would continue to be from aircraft operations. It should be noted that noise from flying activities would tend to mask the noise generated by construction projects for the same exposure area. The perception would be that construction noise likely would not be discernible during periods of aircraft operations. However, there could be periods of time during which construction noise could be discerned and provide minor annoyance. This condition would occur when construction activity is underway and flying activity is low.

In summary, noise from demolition and construction activities would be temporary and intermittent, lasting only as long as the Proposed Action activities. The new buildings would be designed and constructed to meet Air Force NLR criteria. No significant noise impacts would be anticipated.

4.7.3 Mitigation

No cultural resources impacts would occur; therefore, mitigative actions would not be necessary for the alternative action.

4.7.4 Cumulative Impacts

The closest distance between the other action sites and the Proposed Action sites is approximately 300-feet and greater. This distance would preclude combined noise at significant levels. No cumulative noise impacts would be anticipated from the Proposed Action and the other action projects.

4.8 LAND USE

The following evaluation criteria were used in considering impacts to land use:

- Would the action require a new land use category in the Base General Plan?

- Would re-categorization of land as a result of the action cause incompatible land uses?

4.8.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, or maintaining the status quo, the proposed PFC and HAWC would not be constructed. The PFC activities would continue to be served by Buildings 216 and 6004 and the HAWC would continue to operate out of Building 5922. Additionally, a portion of a three-story building (5920) and Building 6004 would continue to be located in Accident Potential Zone 1. The area would continue to be categorized as Housing and Community (Commercial), which is consistent with the existing land use plan in the Tinker AFB General Plan.

4.8.2 Alternative 2 –Proposed Action

Implementation of Alternative 2 would require no change to land use designations on the Base. The planned location for the PFC would occur in areas currently categorized in the Tinker AFB General Plan as Housing (unaccompanied). The alternative action is in direct correlation with the future land use plan of Tinker AFB. Therefore, there would be no land use impacts.

4.8.3 Mitigation

No land use impacts would occur; therefore, mitigative actions would not be necessary for the Proposed Action.

4.8.4 Cumulative Impacts

The facilities anticipated under the other actions would be constructed in areas that would be consistent with the Base land use plan for the area where the facilities would be constructed. No cumulative land use impacts would be anticipated from the Proposed Action and the other projects.

4.9 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable impacts would result from the implementation of the Proposed Action. However, none of the impacts would be significant. Noise from demolition and construction activities would occur. However, the activities would take place during daytime hours and would be at levels that would not cause hearing impairment. The emission of air pollutants associated with demolition and construction would be an unavoidable condition, but is not considered significant and would be eliminated after construction is complete. The loss of aggregate used for concrete, which would become inaccessible, would occur as a result of the construction activities. However, the impact would be insignificant due to the relatively small amount needed. Site grading would remove minimal vegetation. The affected sites are in an area of the Base that was previously disturbed and does not provide significant habitat for many species. The use of nonrenewable energy resources is an unavoidable impact, but the amount used would be insignificant.

4.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts the use of these resources would have on consumption

or destruction of a resource that could not be replaced in a reasonable period of time. The irreversible environmental changes that could result from implementation of proposed alternatives include the consumption of material resources, energy resources, and human resources.

Material resources used for the Proposed Action include building materials (for construction), cement for the driveways, sidewalks, asphalt for the streets, and other various materials. The materials that would be consumed are not in short supply and are readily available from suppliers in the region. Use of these materials would not limit other unrelated construction activities, and therefore, would not be considered significant.

Energy resources would be irretrievably lost. These include petroleum-based products such as gasoline and diesel fuel, natural gas, and electricity. During construction, gasoline and diesel fuel would be used for operation of construction equipment and other vehicles. Natural gas and electricity would be used in the boiler units and PFC after completion. However, because some of the buildings would be more energy efficient than those replaced, consumption of these resources would be expected to decrease. Therefore, it is anticipated that consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

The use of human resources for construction is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the proposed action represents employment opportunities, and is considered beneficial.

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CHAPTER 5

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CHAPTER 6

PERSONS AND AGENCIES CONSULTED

The following persons and agencies consulted during preparation of this EA.

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